

Mathematics Grade 5

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Online:

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C O N N E X I O N S

Rice University, Houston, Texas

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Chapter 1

Term 1

1.1 To be able to do mental arithmetic¹

1.1.1 MATHEMATICS

1.1.2 Number Concept, Addition and Subtraction

1.1.3 Subtraction

1.1.4 EDUCATOR SECTION

1.1.5 Memorandum

- 1.1 24
- 1.2 34
- 1.3 200
- 1.4 30
- 1.5 111
- 1.6 8
- 1.7 180
- 1.8 298
- 1.9 35
- 1.10 995
- 1.11 42
- 1.12 72
- 1.13 132
- 1.14 8
- 1.15 6
- 1.16 7
- 1.17 72
- 1.18 9
- 1.19 318
- 1.20 342

¹This content is available online at <<http://cnx.org/content/m22878/1.1/>>.

1.1.6 Leaner Section

1.1.7 Content

1.1.7.1 Activity: To be able to do mental arithmetic [LO 1.9]

1. Before we look at more methods of subtraction, you have another chance to improve your mental arithmetic skills. Complete the following as quickly as you can.

- 1.1 $38 - 14 =$ _____
- 1.2 $68 - 34 =$ _____
- 1.3 _____ $- 101 = 99$
- 1.4 $110 -$ _____ $= 80$
- 1.5 _____ $- 32 = 79$
- 1.6 $17 +$ _____ $= 25$
- 1.7 $260 +$ _____ $= 440$
- 1.8 $310 - 5 - 7 =$ _____
- 1.9 $400 - 15 -$ _____ $= 350$
- 1.10 $1\ 004 - 9 =$ _____
- 1.11 $6 \times 7 =$ _____
- 1.12 $8 \times 9 =$ _____
- 1.13 $12 \times 11 =$ _____
- 1.14 $48 \div 6 =$ _____
- 1.15 $54 \div 9 =$ _____
- 1.16 _____ $\times 7 = 49$
- 1.17 _____ $\div 6 = 12$
- 1.18 $81 \div$ _____ $= 9$
- 1.19 Double 159: _____
- 1.20 Halve 684: _____

- Colour in the appropriate block:

My mental calculation marks have IMPROVED

| | |
|----------------------------------|-------------------|
| My mental calculation marks have | IMPROVED |
| | DETERIORATED |
| | REMAINED THE SAME |

Table 1.1

1.1.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.2 To be able to solve problems in context²

1.2.1 MATHEMATICS

1.2.2 Number Concept, Addition and Subtraction

1.2.3 Subtraction

1.2.4 EDUCATOR SECTION

1.2.5 Memorandum

1.1 2 614

1.2 5 860

2-4 Own answer

1.2.6 Learner Section

1.2.7 Content

1.2.7.1 Activity: To be able to solve problems in context [LO 1.6]

1.2.7.2 To use a series of techniques to do calculations [LO 1.10]

- You have probably heard on the news or read in the papers that problems like the one described below are very commonplace nowadays. We have to be able to do calculations correctly if we want to find the answers to these problems!

1. Divide into groups of three. See whether you can solve the following problems. Your educator will supply you with the necessary paper to work on.

1.1 After terrible floods in their town, the Sunshine Primary School decides to contribute as many blankets as possible to flood victims. The Principal, Mrs Kuhn, says that about 10 000 blankets are needed. If the learners collect 7 386 blankets, how many more are needed?

1.2 Two factories produce sweets for disadvantaged children. If the Lollipop factory packaged 15 125 sweets and the Jelly Baby factory 20 985, how many fewer sweets did the Lollipop factory have to distribute?

2. Explain to the rest of the class how your group calculated your answers.

3. Compare your methods. How do they differ?

4. Use a calculator to check the answers.

1.2.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.6: We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as:

1.6.1 financial (including buying and selling, profit and loss, and simple budgets);

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers;

1.10.1 adding and subtracting in columns.

²This content is available online at <<http://cnx.org/content/m22879/1.1/>>.

1.3 To determine the equivalence and validity of different representations³

1.3.1 MATHEMATICS

1.3.2 Number Concept, Addition and Subtraction

1.3.3 Subtraction

1.3.4 EDUCATOR SECTION

1.3.5 Memorandum

2.1 and 2.2 own answer

Leaner Section

1.3.6 Content

1.3.6.1 Activity: To determine the equivalence and validity of different representations [LO 2.6]

1.3.6.2 To use strategies to check solutions [LO 1.11]

- During the previous activity you used your own techniques and strategies to solve the problems. In your feedback to the class you probably noticed that there is not only one way in which we can subtract numbers. Divide into groups of three. Read the following problem thoroughly and as a group work through the different methods of solving it.

A rugby match was attended by 32 564 men and 29 436 women.

- How many more men than women watched the match?

1.1 I like doing addition:

$$32\ 564 - 29\ 436$$

$$\text{Therefore: } 29\ 436 + 64 = 29\ 500$$

$$29\ 500 + 500 = 30\ 000$$

$$30\ 000 + 2\ 564 = 32\ 564$$

$$64 + 500 + 2\ 564 = 3\ 128$$

Therefore there were 3 128 more men than women.

1.2 I round off the second number to the nearest 100:

$$32\ 564 - 29\ 436$$

$$\text{Therefore: } 32\ 564 - 29\ 400 = 3\ 164$$

$$3\ 164 - 36 = 3\ 128$$

The answer is 3 128 more men.

1.3 I prefer rounding off the subtrahend to the nearest 1 000:

$$32\ 564 - 29\ 436$$

$$\text{Therefore: } 32\ 564 - 29\ 000 = 3\ 564$$

$$3\ 564 - 436 = 3\ 128$$

1.4 I calculate the difference step by step:

$$32\ 564 - 29\ 436$$

$$\text{Therefore: } 32\ 000 - 29\ 000 = 3\ 000$$

$$564 - 436 = 128$$

$$3000 + 128 = 3\ 128$$

³This content is available online at <<http://cnx.org/content/m22880/1.1/>>.

1.5 I first write the numbers in extended notation:

$$32\ 564 - 29\ 436$$

Thus: $30\ 000 + 2\ 000 + 500 + 60 + 4$

$$\underline{- 20\ 000 + 9\ 000 + 400 + 30 + 6}$$

Now I regroup:

$$20\ 000 + 12\ 000 + 500 + 50 + 14$$

$$\underline{- 20\ 000 + 9\ 000 + 400 + 30 + 6}$$

$$0 + 3\ 000 + 100 + 20 + 8$$

Therefore the answer is 3 128

1.6 I calculate the difference by working with negative numbers:

$$32\ 564 - 29\ 436$$

Therefore: $30\ 000 - 20\ 000 = 10\ 000$

$2\ 000 - 9\ 000 = - 7\ 000$ (I still have to subtract 7 000)

$$500 - 400 = 100$$

$$60 - 30 = 30$$

$4 - 6 = - 2$ (I still have to subtract 2)

The difference therefore is:

$$10\ 000 - 7\ 000 + 100 + 30 - 2 = 3\ 128$$

2. 2.1 Which of the above methods is the easiest for YOU? _____

Why? _____

2.2 See if your group can think of any another method for calculating the difference.

1.3.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1. 11: We know this when the learner uses a range of strategies to check solutions and judge the reasonableness of solutions;

Learning Outcome 2: The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

Assessment Standard 2.6: We know this when the learner determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule.

1.4 To use a series of techniques to do calculations⁴

1.4.1 MATHEMATICS

1.4.2 Number Concept, Addition and Subtraction

1.4.3 Subtraction

1.4.4 EDUCATOR SECTION

1.4.5 Memorandum

1.1 27 848

⁴This content is available online at <<http://cnx.org/content/m22881/1.1/>>.

1.2 18 121
 1.3 254 706
 2.1 8 486 – 5 456 = 3 030
 $84\ 381 - 54\ 351 = 30\ 030$
 $86\ 488 - 56\ 455 = 30\ 033$
 $816\ 823 - 516\ 523 = 300\ 300$
 $814\ 886 - 514\ 556 = 300\ 330$
 2.2 297 300
 3.1 (b) R27 414
 3.2 (a) 22 526
 (b) 65 778
 (c) 668 544

1.4.5.1 PUZZLE

- (a) $378 - 111 = 267 - 110 = 157 - 10 = 147$
 (b) $2\ 598 - 1\ 111 = 1\ 487 - 1\ 111 = 376 - 110 = 266$
 (c) $14\ 210 - 110 = 14\ 100 - 100 = 14\ 000$

Leaner Section

1.4.6 Content

1.4.6.1 Activity: To be able to solve problems in context [LO 1.10]

1.4.6.2 To use strategies to check solutions [LO 1.11]

1.1 _____ = $54\ 321 - 26\ 473$

1.2 _____ = $63\ 904 - 45\ 783$

1.3 _____ = $486\ 213 - 231\ 507$

2. 2.1 Let's have a race! See if you can beat your partner, but remember to work neatly!

- Take a good look at each number.
- Replace the figure 8 with a 5 in each instance.
- Write the new number right below the earlier one.
- Then calculate the difference between the 2 numbers and write the answer in the last space.

e.g.

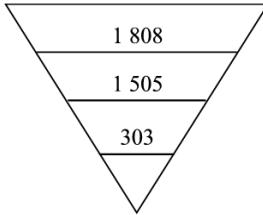


Figure 1.1

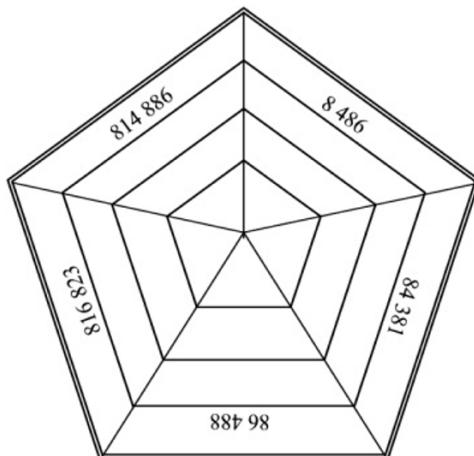


Figure 1.2

2.2 What is the difference between the biggest and the smallest answer?

2.3 Compare your answers with those of your partner.

2.4 Check your answers with the help of a pocket calculator.

3. What follows is still another technique to calculate the difference between two numbers.

3.1 Work in groups of three again. Read the following problems attentively and explain the solutions to one another.

a) Kayla's father buys a brand new Renault Scenic for R147 293 and Wayne's father buys a second-hand car for R69 475. How much more does Kayla's father pay than Wayne's father?

$$\begin{array}{r}
 & 3 & 16 & 12 & 8 & 13 \\
 1 & \cancel{A} & \cancel{7} & \cancel{2} & \cancel{8} & \cancel{8} \\
 - & 6 & 9 & 4 & 7 & 5 \\
 \hline
 7 & 7 & 8 & 1 & 8
 \end{array}$$

Figure 1.3

Kayla's father pays R77 818 more.

- b) Roberto frequently has to make overseas phone calls and his telephone account comes to R30 000. Carli uses her cell phone to make telephone calls and her account comes to R2 586. By what amount is Carli's account less than Roberto's account?

$$\begin{array}{r}
 2 & 9 & 9 & 9 & 10 \\
 \cancel{8} & \cancel{0} & \cancel{0} & \cancel{0} & \cancel{0} \\
 - & 2 & 5 & 8 & 6 \\
 \hline
 2 & 7 & 4 & 1 & 4
 \end{array}$$

Figure 1.4

Carli pays R27 414 less.

3.2 Calculate the following by making use of the above method:

a) _____ = $42\ 063 - 19\ 537$

b) _____ = $264\ 136 - 198\ 358$

c) _____ = $900\ 000 - 231\ 456$

TIME FOR SELF-ASSESSMENT

We have now studied different techniques / strategies to do and to check calculations. How do YOU feel about the work we have just completed?

Assess yourself by circling the figure in the applicable column.

| ** | COMPLETELY UNCERTAIN | SLIGHTLY CERTAIN | FAIRLY CERTAIN | VERY CERTAIN |
|--|----------------------|------------------|----------------|--------------|
| I can round off correctly to the nearest 1 000 | 1 | 2 | 3 | 4 |
| I can subtract by adding | 1 | 2 | 3 | 4 |
| I can estimate the difference by means of rounding off | 1 | 2 | 3 | 4 |
| I can subtract by rearranging numbers in extended notation | 1 | 2 | 3 | 4 |
| I can work with negative numbers | 1 | 2 | 3 | 4 |
| I can subtract vertically | 1 | 2 | 3 | 4 |

Table 1.2

Puzzle!

You may only use the following keys of your calculator:

1 ; - ; 0 ; =

- See if you are able to change the first number into the second number!

e.g. Change 1 416 to 285

$$1\ 416 - 1\ 110 = 306 - 11 = 295 - 10 = 285$$

a) Change 378 into 147

b) Change 2 598 into 266

c) Change 14 210 into 14 000

1.4.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers;

1.10.1 adding and subtracting in columns.

Assessment Standard 1.11: We know this when the learner uses a range of strategies to check solutions and judge the reasonableness of solutions.

1.5 To solve problems in context⁵

1.5.1 MATHEMATICS

1.5.2 Number Concept, Addition and Subtraction

1.5.3 Subtraction

1.5.4 EDUCATOR SECTION

1.5.5 Memorandum

Own opinion

TEST 3 TOTAL: 20

1. (a) Difference
 (a) Addition
 (b) Minuend
2. (a) 105; 70;
 (b) 480; 360;

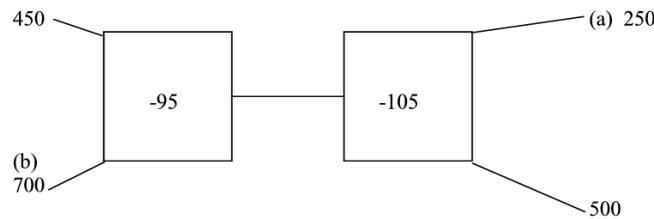


Figure 1.5

4. $46 - 000 - 23\ 000 = 23\ 000$

5. 1 450

6. $23\ 600 + 400 = 24\ 000$

$24\ 000 + 32\ 123 = 56\ 123$

$32\ 123 + 400 + 31 = 32\ 554$

7.

⁵This content is available online at <<http://cnx.org/content/m22882/1.1/>>.

$$\begin{array}{r}
 & & 1 & 14 \\
 5 & 8 & 1 & \cancel{2} \cancel{4} \\
 - & 2 & 6 & 3 & 5 & 7 \\
 \hline
 & 3 & 1 & 7 & 6 & 7
 \end{array}$$

Figure 1.6

8. R500 000 – R13 401
R486 599

1.5.6 Leaner Section

1.5.7 Content

1.5.7.1 Activity: To solve problems in context [LO 1.6]

CHALLENGE

Here is an assignment for your portfolio. Your educator will go through it with you and explain exactly what is expected of you. Make sure that you understand completely before you begin. Remember to work neatly!

- A challenge!

You have won a competition and are richer by a million rand! But you may only buy articles advertised in your local newspaper. Cut out the pictures/advertisements of what you would buy and paste them below, together with the prices. Indicate how much money you will have left after making your purchases. Ask a friend to check your calculations.

ASSESSMENT: ACTIVITY 3.11

| | 1 | 2 | 3 | 4 |
|-------------------------------|---------------------------------|-------------------------------|---------------------------------------|---|
| Neatness and organisation | Work is untidy and un organised | Organised, but hardly legible | Neat and organised, easily legible | Neat, well organised and easily legible |
| Logical reasoning | Hardly any proof of logic | A little logic present | Uses effective Mathematical reasoning | Uses refined logic and reasoning |
| <i>continued on next page</i> | | | | |

| | | | | |
|-----------------------------|-------------------------------|------------------------|--|-------------------|
| Correctness of calculations | Answers wrong (items omitted) | A few errors committed | Sufficient understanding, but subtraction errors committed | Answer is correct |
|-----------------------------|-------------------------------|------------------------|--|-------------------|

Table 1.3

1.5.7.1.1 TEST**SEE HOW WELL YOU CAN COPE!**

1. Write down the correct answer:

1.1 The answer of a subtraction sum is known as the _____

1.2 The inverse of subtraction _____

1.3 In the sum $5\ 676 - 231 = 5\ 445$, the 5 676 is known as the _____ (3)

2. Complete the following number patterns:

2.1 175 ; 140 ; 105; _____; 35

2.2 _____; _____; _____; 240 ; 120 (2)

3. Complete the following flow diagram:

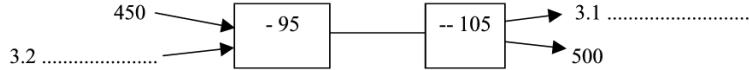


Figure 1.7

(2)

4. Calculate the difference, first rounding off to the nearest 1 000:

4.1 $45\ 679 - 23\ 499$

(3)

5. Complete:

 $6\ 775 - 1\ 448 = 6\ 777 -$ _____

(1)

6. Seko had to calculate the following: $56\ 123 - 23\ 569$. He started off by $23\ 569 + 31 = 23\ 600$

- Complete the sum.

(3)

7. Nomsa forgot to complete her sum. Please do it for her:

$$\begin{array}{r}
 & & 1 & 14 \\
 5 & 8 & 1 & \cancel{2} \cancel{4} \\
 - & 2 & 6 & 3 & 5 & 7 \\
 \hline
 & & & & &
 \end{array}$$

Figure 1.8

- (4)
8. Mr Muruvan had R500 000. After he had paid in cash for a house, he had R13 401 left over. What was the price of his house?
-
-
-
-

(4)
TOTAL: 20

1.5.7.1.2 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.6: We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as:

1.6.1 financial (including buying and selling, profit and loss, and simple budgets);

1.6 To be able to do mental arithmetic⁶

1.6.1 MATHEMATICS

1.6.2 Number Concept, Addition and Subtraction

1.6.3 EDUCATOR SECTION

1.6.4 Memorandum

- 1.1 20
- 1.2 28
- 1.3 25
- 1.4 24
- 1.5 6
- 1.6 76
- 1.7 9

⁶This content is available online at <<http://cnx.org/content/m22751/1.1/>>.

- 1.8 7
 1.9 48
 1.10 11
 1.11 30
 1.12 8
 1.13 9
 1.14 12
 1.15 9
 1.16 108
 1.17 45
 1.18 81
 1.19 7
 1.20 12

1.6.5 Leaner Section

1.6.6 Content

1.6.6.1 ACTIVITY: To be able to do mental arithmetic [LO 1.9]

- In Mathematics it is very important that you must be able to think quickly. Let us see how you COPE! Complete the following mental arithmetic test as quickly and accurately as possible.

- 1.1 $5 \times 4 =$ _____
 1.2 $14 + 9 + 5 =$ _____
 1.3 $32 - 7 +$ _____
 1.4 $8 \times 3 =$ _____
 1.5 $7 \times$ _____ $= 42$
 1.6 Double 38: _____
 1.7 _____ $\times 8 = 72$
 1.8 $8 \times$ _____ $= 56$
 1.9 $4 \times 12 =$ _____
 1.10 _____ $\times 12 = 132$
 1.11 $126 \div 6 + 9 =$ _____
 1.12 $48 \div$ _____ $= 6$
 1.13 $12 \times$ _____ $= 108$
 1.14 _____ $\times 6 = 72$
 1.15 $54 \div 6 =$ _____
 1.16 Halve 216: _____
 1.17 _____ $\div 5 = 9$
 1.18 _____ $\div 9 = 9$
 1.19 $63 \div 9 =$ _____
 1.20 $144 \div 12 =$ _____

Complete: I have _____ correct.

DID YOU KNOW?

We use the Hindu-Arabic number system!

The ancient Romans developed their counting system more than 2 000 years ago. Some of their figures look like these:

I ; II ; III ; IV ; V

1.6.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.7 To count and calculate correctly without using a pencil and paper⁷

1.7.1 MATHEMATICS

1.7.2 Number Concept, Addition and Subtraction

1.7.3 EDUCATOR SECTION

1.7.4 Memorandum

2.

2.1 add 12

2.2 less 40

2.3 less 12

2.4 add 12

2.5 add 28

3.

3.1 9; 11; 28; 100; 456

3.2 9; 1; 30; 82

3.3 2; 8; 11; 17

4.

4.1 99

4.2 36

1.7.5 Learner Section

1.7.6 Content

1.7.6.1 ACTIVITY: To count and calculate correctly without using a pencil and paper [LO 1.1, LO 1.8]

1. In the previous activity you worked with small numbers. Now let us work with greater numbers. Team up with a friend and count:

1.1 in ones from 985 tot 1 005

1.2 in twos from 640 backwards to 596

1.3 in fives from 2 035 to 2 095

1.4 in tens from 1 890 backwards to 1 760

1.5 in hundreds from 800 to 2 600

1.6 in thousands from 4 300 to 9 300

2. Sometimes one does addition and/or subtraction unwittingly (without being aware that that is what you are doing) to get the right answer. Can you tell your friend what to do to each of these numbers in order to change it into the new number?

⁷This content is available online at <<http://cnx.org/content/m22752/1.1/>>.

| | NUMBER | | NEW NUMBER |
|-----|--------|-----|------------|
| 2.1 | 126 | ??? | 138 |
| 2.2 | 868 | ??? | 828 |
| 2.3 | 943 | ??? | 931 |
| 2.4 | 9 987 | ??? | 9 999 |
| 2.5 | 6 472 | ??? | 6 500 |

Table 1.4

3. If we know the multiples of 10, 100 and 1 000 well, we can divide by them by doing mental arithmetic (without pencil and paper). Can you give the following answers faster than your friend?

3.1 How many tens are there in: 90 ; 110 ; 280 ; 1 000 ; 4 560 ?

3.2 How many hundreds are there in: 900 ; 1 100 ; 3 000 ; 8 200 ?

3.3 How many thousands are there in: 2 000 ; 8 000 ; 11 000 ; 17 000 ?

Do you see the pattern in the answers? What is the secret of calculating the answers so easily?

$\div 10$:

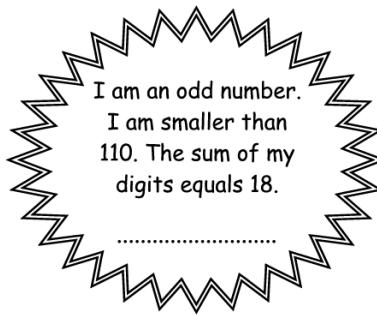
$\div 100$:

$\div 1\ 000$:

DO YOU STILL REMEMBER THE FOLLOWING?

An EVEN number is exactly divisible by 2 (can be shared equally amongst 2). An ODD number cannot be divided exactly by 2 without a remainder or without having a fraction in the answer, e.g. 3 can be divided by 2, but the answer is 1 .

4. Now use your knowledge of even and odd numbers to see whether you can solve the following riddles

**Figure 1.9**

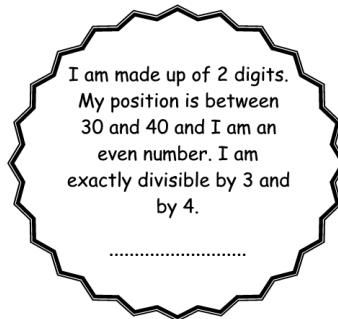


Figure 1.10

4.2

- Now look at the following diagram.

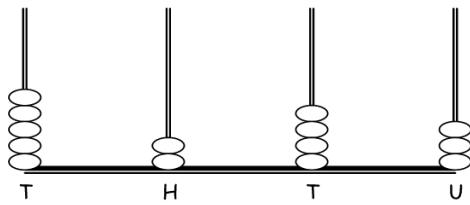


Figure 1.11

The number that is represented here is 5 243.

We read it as:

five thousand, two hundred and forty-three.

- We can also write it like this:

$$\begin{aligned}
 5\ 243 &= 5\ 000 + 200 + 40 + 3 \\
 &= (5 \times 1\ 000) + (2 \times 100) + (4 \times 10) + (3 \times 1)
 \end{aligned}$$

This way of writing is called expanded notation.

1.7.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.1: We know this when the learner counts forwards and backwards in whole number intervals and fractions;

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems.

1.8 To recognise numbers and represent them correctly⁸

1.8.1 MATHEMATICS

1.8.2 Number Concept, Addition and Subtraction

1.8.3 EDUCATOR SECTION

1.8.4 Memorandum

1.

1.1 A: 2 613

B: 4 871

$$1.2 \text{ A: } 2\ 613 = 2\ 000 + 600 + 10 + 3$$

$$= (2 \times 1\ 000) + (6 \times 100) + (1 \times 10) + (3 \times 1)$$

$$\text{B: } 4\ 871 = 4\ 000 + 800 + 70 + 1$$

$$= (4 \times 1\ 000) + (8 \times 100) + (7 \times 10) + (1 \times 1)$$

3.

3.1 800; 6

(8×100) ; (6×1)

3.2 4 000; 90

$(4 \times 1\ 000)$; (9×10) ; (8×1)

4.

4.1 20

4.2 8

4.3 5 000

4.4 600

BRAIN TEASERS!

a) 7 846

b) 7 740

c) 3 251

d) 8 292

e) 10

f) 100

1.8.5 Learner Section

1.8.6 Content

1.8.6.1 Activity: To recognise numbers and represent them correctly [LO 1.3]

1.8.6.2 To recognise the place value of digits [LO 1.4]

- Every digit in every number has a certain value and meaning. Have you ever considered what the 3 in 435 819 means? Let us see.

⁸This content is available online at <<http://cnx.org/content/m22753/1.1/>>.

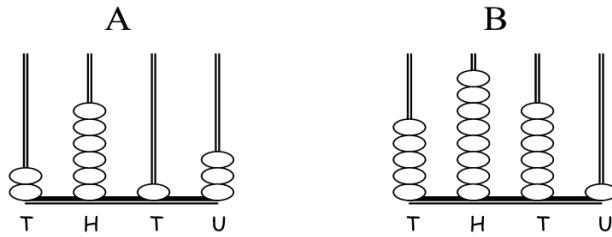


Figure 1.12

1.1 Which number is represented in:

A: _____
B: _____

1.2 Write the number in expanded notation:

A: _____

B: _____

2. For the next exercise you must know the place value of every digit. If you can determine this, represent the numbers 6 038 and 4 792 on the diagrams below.

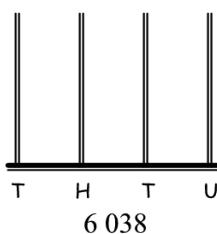


Figure 1.13

3. It is easier to recognise and represent numbers if we write them in expanded notation. By doing this we know the value of every digit. Fill in the missing numbers.

$$3.1 \quad 9\ 826 = 9\ 000 + \dots + 20 + \dots$$

$$= (9 \times 1\ 000) + (\dots \times \dots) + (2 \times 10) + (\dots \times \dots)$$

$$3.2 \quad 4\ 198 = \dots + 100 + \dots + 8$$

$$= (\dots \times \dots) + (1 \times 100) + (\dots \times \dots) + (\dots \times \dots)$$

DO YOU UNDERSTAND?

The VALUE of the 7 in 8 427 is 7.

The VALUE of the 7 in 8 724 = 700.

4. Let us review the difference between value and place value. Can you tell a friend the place value of every digit below? Then write down the value of every digit in bold print.

4.1 8 329 _____
 4.2 4 238 _____
 4.3 25 098 _____
 4.4 89 641 _____

BRAIN TEASERS!

- See if you are able to answer the following questions correctly:

- 7 856 is 10 more than _____
- 7 640 is 100 less than _____
- _____ is the first odd number after 3 249
- _____ is the even number just before 8 294
- 8 000 is _____ times bigger than 800
- 6 000 is _____ times bigger than 60

TIME FOR SELF-ASSESSMENT

| Complete the following by placing a tick in the appropriate block: | Uncertain | Fairly certain | Altogether certain | Excellent |
|--|-----------|----------------|--------------------|-----------|
| I can count in hundreds, both forwards and backwards (LO 1.1). | | | | |
| I can count forwards and backwards in thousands (LO 1.1). | | | | |
| I know the difference between odd and even numbers (LO 1.3). | | | | |
| I can write numbers in expanded notation (LO 1.3). | | | | |
| I can determine the value of digits in numbers (LO 1.3). | | | | |

Table 1.5

1.8.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.3: We know this when the learner recognises and represents numbers in order to describe and compare them:

Assessment Standard 1.4: We know this when the learner recognises the place value of digits in whole numbers to at least 6-digit numbers.

1.9 To improve your mental arithmetic skills⁹

1.9.1 MATHEMATICS

1.9.2 Number Concept, Addition and Subtraction

1.9.3 EDUCATOR SECTION

1.9.4 Memorandum

1. 11; 25; 6; 12; 11; 15; 27; 34
24; 8; 14; 9; 17; 13; 11; 12
 2.
2.1 519; 527; 535; 543
2.2 825; 810; 795; 780
2.3 3 770; 3 779; 3 797; 3 806
2.4 99 800; 9 760; 9 640; 9 600
 3.
3.1 3 003; 333; 330; 303; 33
3.2 6 666; 6 606; 6 600; 6 060; 6 006
- Leaner Section

1.9.5 Content

1.9.5.1 ACTIVITY: To improve your mental arithmetic skills [LO 1.9]

1.9.5.2 To examine and extend numeric patterns [LO 2.1]

1. It happens often that one has to think quickly. That is why mental arithmetic skills are very important. Let us see whether you can work faster than your friend. Work in pairs and see who can give the answer first. Start at the arrow every time and work clockwise.

⁹This content is available online at <<http://cnx.org/content/m22754/1.1/>>.

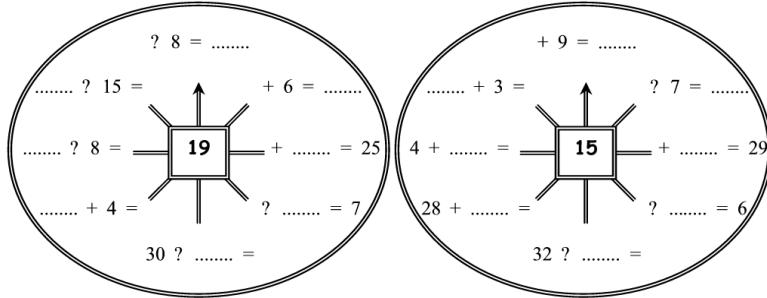


Figure 1.14

DO YOU STILL REMEMBER?

Rows of numbers sometimes provide very interesting patterns. If we, for instance, begin at 350 and keep adding 15, we'll get the following pattern:

350 ; 365 ; 380 ; 395 ; 410

2. Rows of numbers always have some sort of numeric pattern. Examine the following patterns and see whether you can complete the rows correctly (use your pocket calculator, if necessary, to check that you have worked correctly):

- 2.1 495 ; 503 ; 511 ; _____ ; _____ ; _____ ; _____
- 2.2 870 ; 855 ; 840 ; _____ ; _____ ; _____ ; _____
- 2.3 3 752 ; 3 761 ; _____ ; _____ ; 3 788 ; _____ ; _____
- 2.4 _____ ; _____ ; 9 720 ; 9 680 : _____ ; _____

3. In our everyday life it is very important to be able to read and say numbers correctly. We also need to know which number is greater/smaller than the other. Just think of the number of times per day you work with money. If you save R220, for instance, you would certainly not want R202 to be written in your savings booklet! Look at the following numbers and write them down in order from the GREATEST to the SMALLEST (descending order).

3.1 303 ; 330 ; 333 ; 33 ; 3 003

3.2 6 006 ; 6 600 ; 6 666 ; 6 060 ; 6 606

1.9.6 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.9: We know this when the learner performs mental calculations;

Learning Outcome 2: The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

Assessment Standard 2.1: We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

1.10 To recognise numbers and compare them to one another¹⁰

1.10.1 MATHEMATICS

1.10.2 Number Concept, Addition and Subtraction

1.10.3 EDUCATOR SECTION

1.10.4 Memorandum

- 1.
- 1.1 8 366
- 1.2 7 452
- 1.3 8 664
- 1.4 9 548
- 2.
- 2.1 6 750
- 2.2 8 260
- 2.3 3 516
- 2.4 9 379
- 3.
- 3.1 <
- 3.2 <
- 3.3 <
- 3.4 <

1.10.4.1 Answer on p. 11-12

1. 46
2. 26
3. 39 337
4. 5 000 I)
5. 4 072 j)
6. 4 440
7. 7 739
8. =
9. 14; 5
10. 1 000; 8

1.10.5 Learner Section

1.10.6 Content

1.10.6.1 Activity: To recognise numbers and compare them to one another [LO 1.3]

1.10.6.2 To be able to calculate correctly [LO 1.8]

MORE OR LESS?

¹⁰This content is available online at <<http://cnx.org/content/m22757/1.1/>>.

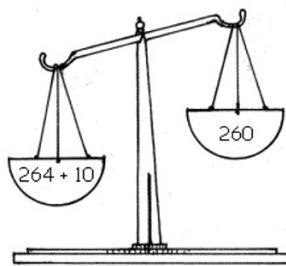


Figure 1.15

1. If you know where the tens and hundreds are in a number (place value) it is easy to add 10 or 100 (more than), or subtract 10 or 100 (less than). See whether you can write down the answer immediately! Which number is:

1.1 10 more than 8 356? _____

1.2 10 less than 7 462? _____

1.3 100 more than 8 564? _____

1.4 100 less than 9 648? _____

2. In this activity you must read the question carefully and compare your answer to the given number to ensure that you have worked correctly.

2.1 6 740 is 10 less than _____

• 8 360 is 100 more than _____

2.3 3 526 is 10 more than _____

2.4 9 279 is 100 less than _____

Note: "less than" now means that you must add to get the right answer, and "more than" means that you must subtract to calculate the answer!

COMPARING AND ARRANGING

1.10.6.2.1 DO YOU REMEMBER THIS?

> means "larger than"

< means "smaller than"

= means "equal to" or "the same as"

3. We can use the mathematical symbols < ; > and = when we compare answers. It is important that you calculate the answer correctly, or the symbol will be wrong! Now calculate the answer where necessary, compare the answer left of the é wit the one right of the é and then complete: < ; > or =:

3.1 $(5 \times 6) + 9 * 41$

3.2 $8\ 921 * 9\ 821$

3.3 $2\ 356 * 2\ 000 + 500 + 30 + 6$

3.4 $4\ 000 + 200 + 50 + 7 * 4\ 275$

FUN WITH THE POCKET CALCULATOR!

Work with a friend. You will need one pocket calculator.

**Figure 1.16**

- Player A types in any four-digit number on the pocket calculator, e.g. 4 986.
- Player B now "shoots down" any of the figures by means of subtraction, e.g. $4\ 986 - 80 = 4\ 906$.
- Take turns to "shoot down" figures. The winner is the player who gets 0 on the display screen.

ASSESS YOURSELF BEFORE GOING FURTHER!

Complete the following by marking the applicable column only:

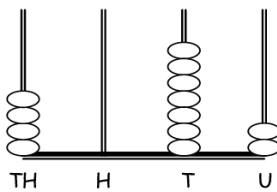
| | Not at all | Almost | Good | Excellent |
|---|------------|--------|------|-----------|
| <ul style="list-style-type: none"> • I am able to see the patterns in rows of numbers and to complete the number patterns (LO 2.1) | | | | |
| <i>continued on next page</i> | | | | |

| | | | | |
|---|--|--|--|--|
| • I am able to arrange numbers from large to small and vice versa (LO 1.3) | | | | |
| I am able to insert the signs that show relationship ($>$; $<$; $=$) correctly (LO 1.3) | | | | |

Table 1.6

LET US SEE HOW YOU ARE COPING.

- Are you able to answer the following questions correctly?
- How many hundreds are in 4 600? _____
 - How many thousands are in 26 000? _____
 - Encircle all the odd numbers in the following:
14 ; 39 ; 128 ; 337 ; 4 000
 - What is the value of the 5 in 5 713? _____
 - Which number is represented in the following diagram?

**Figure 1.17**

- Encircle the largest number:
4 040 ; 4 404 ; 4 440 ; 4 004
- Which number is 100 more than 7 639? _____
- Fill in $>$; $<$ of $=$:
 $40 + 200 + 3\ 000 + 6$ _____ $3\ 246$
- Complete the pattern:
41 ; 32 ; 23 _____ ; _____
- Complete:
 $2\ 386 = (2 \times \underline{\hspace{2cm}}) + (3 \times 100) + (\underline{\hspace{2cm}} \times 10) + (6 \times 1)$

1.10.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.3: We know this when the learner recognises and represents numbers in order to describe and compare them:

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems.

1.11 To represent, recognise and compare numbers¹¹

1.11.1 MATHEMATICS

1.11.2 Number Concept, Addition and Subtraction

1.11.3 EDUCATOR SECTION

1.11.4 Memorandum

- 1.1 24; 48; 64; 32; 120; 16; 96; 88
- 1.2 36; 18; 45; 81; 54; 63; 108;
- 1.3 36; 24; 48; 144; 60; 120; 96; 108;
- 2.1 27
- 2.2 68,5
- 2.3 10
- 2.4 6
- 2.5 +
- 2.6 54
- 2.7 7
- 2.8 300
- 2.9 300
- 2.10 984
- 2.11 8
- 2.12 43
- 2.13 112
- 2.14 72
- 2.15 134
- 2.16 4
- 2.17 132
- 2.18 84
- 2.19 3 600
- 2.20 7 000
- 3.1 10 000
- 3.2 10 000
- 3.3 10 000
- 3.4 10 000
- 4. 1 000; 10 000
- 5.
 - (i) twenty three thousand nine hundred and eighteen
 - (ii) forty seven thousand and seven

¹¹This content is available online at <<http://cnx.org/content/m22758/1.1/>>.

6.

6.1 A: 10 000

B: 12 500

C: 14 000

D: 16 500

E: 18 000

7.

7.1 10

7.2 100

7.3 1 000

7.4 60 000

7.5 100

7.6 10

7.7 36 567

7.8 16 824

7.9 3 612

7.10 10 000

1.11.5 Leaner Section

1.11.6 Content

1.11.6.1 Activity: To represent, recognise and compare numbers [LO 1.3]

1.11.6.2 To be able to calculate correctly [LO 1.8]

1.11.6.3 To improve mental arithmetic skills [LO 1.9]

1. If you know your tables very well it is easy to multiply and divide, especially with greater numbers. Work with a friend. See how quickly you can catch the correct fishes that go with the multiplication tables, by colouring them in.

1.1 $8 \times$ table - green

1.2 $9 \times$ table - blue

1.3 $12 \times$ table - yellow

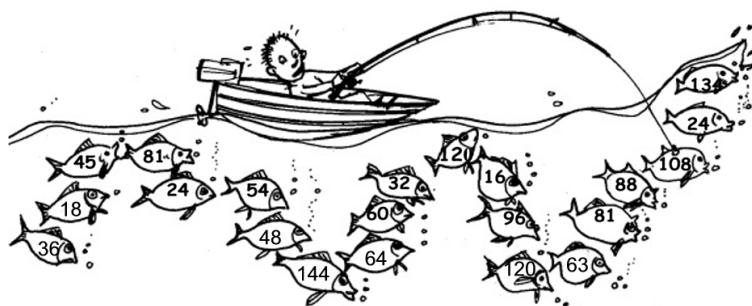


Figure 1.18

2. Now let us see whether you can improve your mental arithmetic skills! Work on your own and complete the following mental arithmetic test as quickly and accurately as possible! (Note: in Mathematics brackets mean “do that bit first”).

- 2.1 $14 + 9 + 4 = \underline{\hspace{2cm}}$
- 2.2 Halve 137: $\underline{\hspace{2cm}}$
- 2.3 $30 \times \underline{\hspace{2cm}} = 3000$
- 2.4 $(42 \div \underline{\hspace{2cm}}) + 9 = 16$
- 2.5 $567 \underline{\hspace{2cm}} 23 = 590$
- 2.6 $9 \times 6 = \underline{\hspace{2cm}}$
- 2.7 $\underline{\hspace{2cm}} \times 8 = 56$
- 2.8 $\underline{\hspace{2cm}} - 15 = 285$
- 2.9 $80 + 65 + 155 = \underline{\hspace{2cm}}$
- 2.10 $1\ 003 - 19 = \underline{\hspace{2cm}}$
- 2.11 $72 \div 9 = \underline{\hspace{2cm}}$
- 2.12 $(5 \times 6) + 13 = \underline{\hspace{2cm}}$
- 2.13 $108 \div \underline{\hspace{2cm}} \div 12 = 8$
- 2.14 $\underline{\hspace{2cm}} \div 12 = 6$
- 2.15 Double 67: $\underline{\hspace{2cm}}$
- 2.16 $(5 \times \underline{\hspace{2cm}}) - 9 = 11$
- 2.17 $11 \times 12 = \underline{\hspace{2cm}}$
- 2.18 $\underline{\hspace{2cm}} \div 7 = 12$
- 2.19 Round off to the nearest 100: 3 550 $\underline{\hspace{2cm}}$
- 2.20 Round off to the nearest 1 000: 7 299 $\underline{\hspace{2cm}}$

Colour in:

| | | | |
|---|--------|-------|----------|
| My previous mental arithmetic mark was: | BETTER | WORSE | THE SAME |
|---|--------|-------|----------|

Table 1.7

3. In this activity it is important to look at the value and place value of every digit. Work with a friend and see whether you can answer the following questions:

- 3.1 Which number is 1 more than 9 999? $\underline{\hspace{2cm}}$
- 3.2 Which number is 10 more than 9 990? $\underline{\hspace{2cm}}$
- 3.3 Which number is 100 more than 9 900? $\underline{\hspace{2cm}}$
- 3.4 Which number is 1 000 more than 9 000? $\underline{\hspace{2cm}}$
- 3.5 The number 10 000 is 10 more than $\underline{\hspace{2cm}}$

4 Let's see if you were right!

TEN THOUSANDS

DO YOU REMEMBER?

$$10 \text{ units} = 10 \times 1 = 10$$

$$10 \text{ tens} = 10 \times 10 = 100$$

$$10 \text{ hundreds} = 10 \times 100 = 1\ 000$$

4. Complete the following:

$$10 \text{ thousands} = 10 \times \dots = \dots$$

In the notation column it looks like this:

| $\times 10 \times 10 \times 10 \times 10$ | | | | |
|---|--------------------------|----------------|---------------|--------------|
| Ten thousands | Thousands | Hundreds | Tens | Units |
| TT | T | H | T | U |
| 10 000 | 1 000 | 100 | 10 | 1 |
| $10 \times 10 \times 10 \times 10$ | $10 \times 10 \times 10$ | 10×10 | 10×1 | 1×1 |
| $\div 10 \ 10 \div 10 \div 10$ | | | | |

Table 1.8

DID YOU KNOW?

We read 43 685 as:

forty three thousand, six hundred and eighty five

5. In our everyday lives it is also important to be able to say numbers correctly in words, because it will help us to compare numbers with one another. Write the following numbers in words:

5.1 23 918 _____

5.2 47 007 _____

6. A number line can also help you represent numbers more easily. You can "see" where they lie on the number line and compare them more easily. Study the number line below:

- 6.1 Which numbers are omitted at A, B, C, D and E?

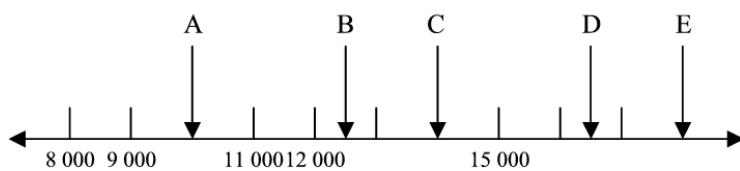


Figure 1.19

A: _____

B: _____

C: _____

D: _____

E: _____

- 6.2 Now take turns with a friend to show where the following numbers will be on the number line. Use an arrow:

a) 8 979

b) 11 003

c) 12 250

d) 14 997

e) 16 016

7. It is important to calculate answers correctly. To do this, we must decide what to do. Decide how you are going to calculate the answer of each question. Then fill in the missing numbers. Then compare your work with that of a friend.

7.1 $10\ 000 =$ _____ thousands

- 7.2 $10\ 000 =$ _____ hundreds
 7.3 $10\ 000 =$ _____ tens
 7.4 $6 \times 10 \times 10 \times 10 \times 10 =$ _____
 7.5 $500 \times$ _____ $= 50$
 000
 7.6 $3\ 000 \times$ _____ $= 30\ 000$
 7.7 26 567 is 10 000 less than _____
 7.8 _____ is 10 000 more than 6 824
 7.9 _____ is 50 000 less than 53 612
 7.10 15 000 lies exactly halfway between _____ and 20 000

LET'S REVISE!

DO YOU STILL REMEMBER?

If you are asked to round off 627 to the nearest 10, it simply is a different way of asking:
 Is 627 nearer to 630 or to 620?

Let us have another look at the number line:

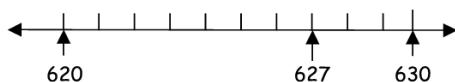


Figure 1.20

627 is nearer to 630. If we therefore round 627 off to the nearest 10, the answer will be 630.

NOTE THIS:

If the number is exactly halfway between two numbers, e.g. 625, we round it off to the higher number.
 The answer will therefore be 630.

LET'S REVISE MORE

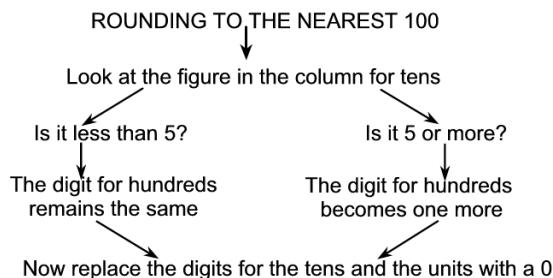


Figure 1.21

1.11.6.3.1 CHALLENGE

Are you able to complete the following?

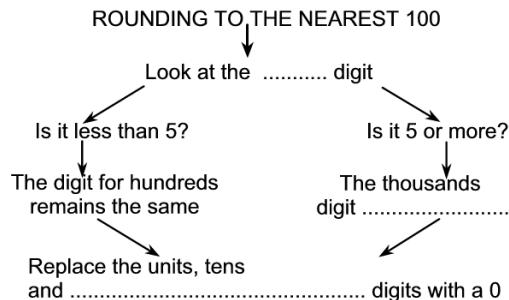


Figure 1.22

1. Rounding off can help you to estimate answers quickly. In this way you can determine what an answer should be approximately. Use your existing knowledge of rounding off and complete:

Round off to the nearest 100:

1.1

- a) 624 -----
- b) 896 -----
- c) 450 -----
- d) 1 239 -----

Round off to the nearest 1 000:

1.2

- a) 3 429 -----
- b) 8 140 -----
- c) 25 712 -----
- d) 56 500 -----

1.3 True or False?

- a) 249 rounded to the nearest 100, is 200 -----
- b) 587 rounded to the nearest 100, is 600 -----
- c) 11 450 rounded to the nearest 1 000, is 11 000 -----
- d) 23 811 rounded to the nearest 1 000, is 24 000 -----

| NUMBER CORRECT | CODE |
|----------------|------|
| 1 – 4 | 1 |
| 5 – 8 | 2 |
| 9 – 12 | 3 |
| 13 – 15 | 4 |

Table 1.9

1.11.6.3.2 PLAY THIS GAME

Work with a friend. Use playing cards from which the 10, Jack, Queen, King, Ace and Joker have been removed.

- Player A chooses any five cards and places them face up, e.g. 5 ; 7 ; 1 ; 2 ; 1
- Player B now has to arrange the cards to obtain the highest possible number, e.g. 75 321. Write it down.
- Then player B arranges the cards to obtain the lowest number possible, e.g. 12 357. Write it down.
- Next, player B calculates the difference between the 2 numbers with the help of a pocket calculator.
- Take turns to use all the cards in this way and compare your answers.
- Do you detect any pattern?

1.11.6.3.3 TIME FOR SELF-ASSESSMENT ONCE MORE

At this stage we would like to know how YOU feel about the work we have done thus far. Be honest and colour in the right block!

| | | | |
|--|-------|-------|-------|
| <ul style="list-style-type: none"> • I know the $8\times$, $9\times$ and $12\times$ tables to $12 \times \dots$. And have seen the patterns in each | ----- | ----- | ----- |
| <ul style="list-style-type: none"> • I understand the meaning of ten thousands | ----- | ----- | ----- |
| <ul style="list-style-type: none"> • I am able to read numbers from a number line | ----- | ----- | ----- |
| <ul style="list-style-type: none"> • I am able to round off to the nearest 100 and use rounding off to estimate and to solve problems | ----- | ----- | ----- |
| <i>continued on next page</i> | | | |

| | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> • I am able to round off correctly to the nearest 1 000 and use rounding off to estimate and to solve problems | | | |
|--|--|--|--|

Table 1.10

1.11.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.3: We know this when the learner recognises and represents numbers in order to describe and compare them;

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems;

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.12 To count forward in intervals¹²

1.12.1 MATHEMATICS

1.12.2 Number Concept, Addition and Subtraction

1.12.3 EDUCATOR SECTION

1.12.4 Memorandum

1. 6; 12; 18; 24; 30; 36; 42; 48; 54; 60; 6; 72
7; 14; 21; 28; 35; 42; 49; 56; 63; 70; 7; 84
8; 16; 24; 32; 40; 48; 56; 64; 72; 80; 8; 96
9; 18; 27; 36; 45; 54; 63; 72; 81; 90; 9; 108
2. 72; 24; 48; 96; 108; 60
3. 1; 2; 5; 10
1; 3; 5; 15
1; 2; 4; 8; 16
1; 2; 3; 4; 6; 8; 12; 24
1; 2; 3; 5; 6; 10; 15; 30
4. 13; 2; 17; 11; 5; 23; 7; 19; 3; 29
5. 5.1

¹²This content is available online at <<http://cnx.org/content/m22760/1.1/>>.

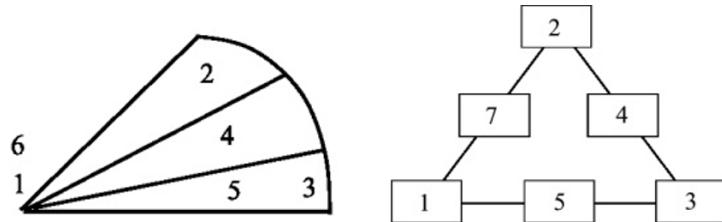


Figure 1.23

5.2 b)

6

9

4

2

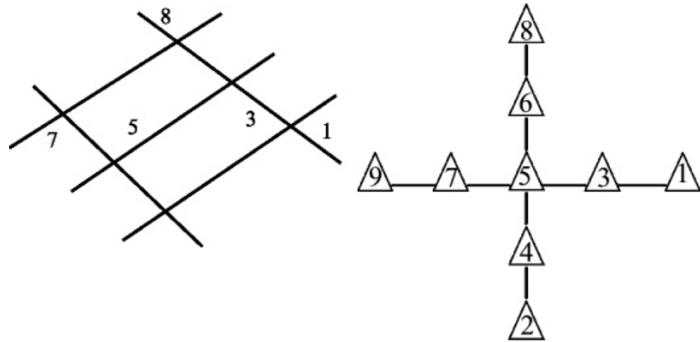


Figure 1.24

1. 10 000
 2. twenty six thousand four hundred and nine
 3. 300
 4. 5 000
 5. 6; 12; 18; 24
 6. 1; 2; 3; 4; 6; 12
 7. true
- true
- TEST 1
1. $6\ 000 + 400 + 90 + 8$

$$(1 \times 1\ 000) + (4 \times 100) + (9 \times 10) + (8 \times 1)$$

2. a) 200
- b) 70 000

3. a) 2 674
 b) 16 537
 a) 800
4. a) 7 420; 7 440
 b) 16 775; 16 750
 6. a) >
 b) >
 7. a) seventy six thousand and eight
 b) 68 439
 8. a) (i) 1 800
 (i) 34 700
- b) (i) 5 000
 (i) 78 000
- 9 a) 6; 12; 18; 24
 b) 1; 3; 17; 19
 c) 1; 2; 3; 4; 6; 12
 d) 2; 17; 19
 e) 2; 4; 6; 12; 18; 24; 40

1.12.5 Leaner Section

1.12.6 Content

1.12.6.1 Activity: To count forward in intervals [LO 1.1]

1.12.6.2 To recognise, represent, describe and compare numbers, counting down and up in fixed intervals [LO 1.3]

1. LET US RACE!

The next activity will help you to improve your skill in adding or subtracting the same number every time. This way you also learn your multiplication tables that are necessary for correct multiplication and division!

Work with a friend. You need a stopwatch. You have to "climb" the following ladders by giving the correct answers. Then it is your friend's turn. The one who works fastest while doing it CORRECTLY is the winner. (Check with a pocket calculator!)

START AT THE TOP AND GO DOWN.

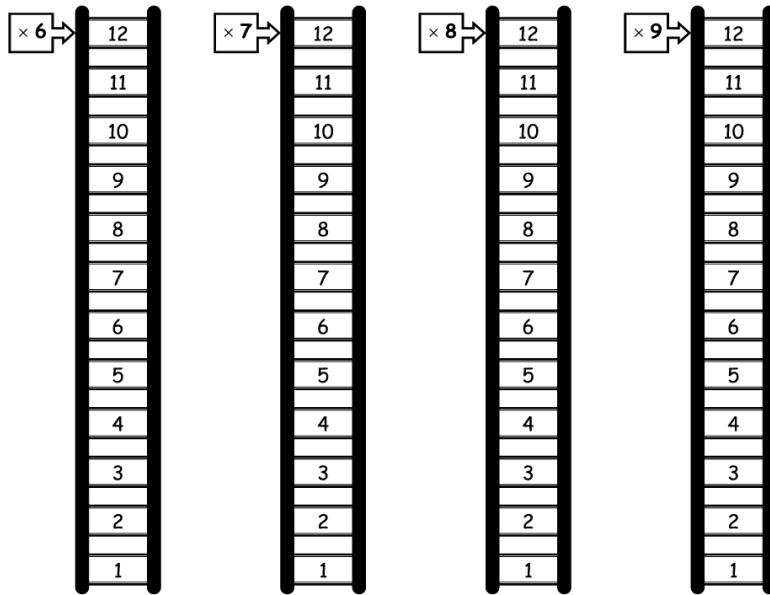


Figure 1.25

NOW START AT THE BOTTOM AND GO UP.

MULTIPLES

DO YOU STILL REMEMBER?

The answers that you got in the above exercise are MULTIPLES of the $6\times$, $7\times$, $8\times$ and $9\times$ tables.

A MULTIPLE is obtained when a given number (e.g. 6) is multiplied by another number or series of numbers.

E.g. the multiples of 5 are 5; 10; 15; 20; 25; etc.

2. Did you know? Multiples help you to add fractions correctly. It is therefore important that you know the multiples of your multiplication tables as soon as possible. Let us practise! Colour in the multiples of 12:

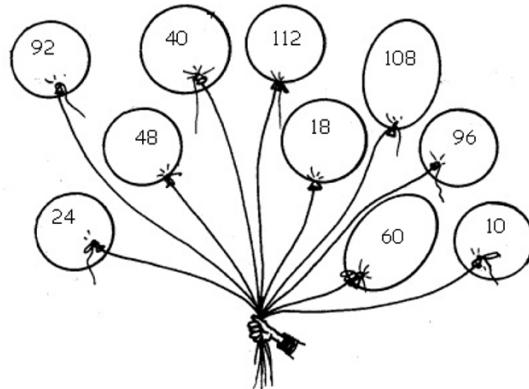


Figure 1.26

FACTORS**DID YOU KNOW?**

Factors are the parts/components of a multiple. Factors of 10 are: 1; 10; 2 and 5.

If we are looking for numbers that can be divided into 12, for instance, we find 1 ; 2 ; 3 ; 4 ; 6 and 12. These numbers are FACTORS of 12.

Suggestion: Think of "pairs":

$$1 \times 12 = 12$$

$$2 \times 6 = 12$$

$$3 \times 4 = 12$$

3. It is important to have sufficient knowledge of factors, because this can help you to divide correctly and to simplify fractions. Try to complete the table below:

| | Number | Factors |
|------|--------|---------------|
| E.g. | 8 | 1 ; 2 ; 4 ; 8 |
| | 10 | ..... |
| | 15 | ..... |
| | 16 | ..... |
| | 24 | ..... |
| | 30 | ..... |

Table 1.11

ASK A FRIEND TO ASSESS YOUR WORK!

- Work with a friend.
- Answer the following questions and ask your friend to place a tick in the appropriate column:

| | Not at all | Reason-ably good | Good | Excellent |
|---|------------|------------------|------|-----------|
| I am able to recognise, describe and compare multiples (LO 1.3) | | | | |
| I am able to recognise, describe and compare factors (LO 1.3) | | | | |
| I am able to recognise, describe and compare prime numbers (LO 1.3) | | | | |
| | | | | |

Table 1.12**PRIME NUMBERS**

Please note:

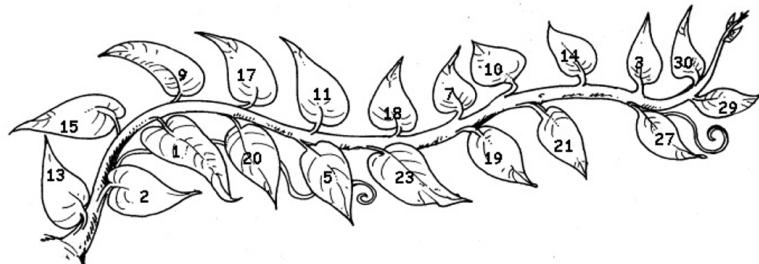
A PRIME NUMBER has only 2 factors:

1 and the number itself.

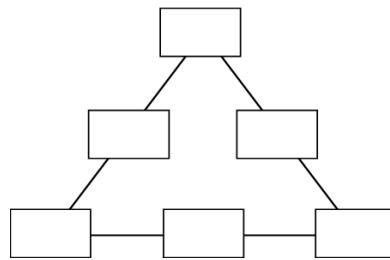
A PRIME NUMBER is larger than 1.

2, 3 and 5 are examples of PRIME NUMBERS, because only 1 and the number itself can be divided into 2, 3 and 5 exactly.

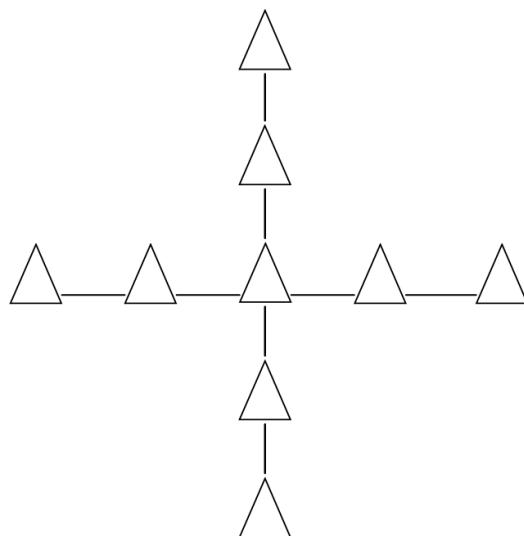
4. Use green to colour the "prime number leaves":

**Figure 1.27****5. BRAIN TEASER!**

5.1 Arrange the numbers from 1 to 6 in the diagram in such a way that the sums of the different sides are the same.

**Figure 1.28**

5.2 Arrange the numbers from 1 to 9 in such a way in the diagram that the sums of the axes (vertical and horizontal lines) are the same.

**Figure 1.29**

Let us see how well you understand the above work.

Complete the following as accurately as possible:

1. Which number is 10 more than 9 990? _____ (1)
 2. Write the following number in words: 26 409
- (1)
3. Round off to the nearest 100: 325 _____ (1)
 4. Round off to the nearest 1 000: 4 500 _____ (1)
 5. Encircle the multiples of 6:

6 ; 9 ; 12 ; 15 ; 18 ; 21 ; 24 (2)

6. Write down all the factors of 12.

(2)

7. True or False: 13 is a prime number _____ (1)

1 is not a prime number _____ (1)

10

HOW WELL DID YOU COPE THIS TIME?

- Colour in the picture that illustrates your performance!

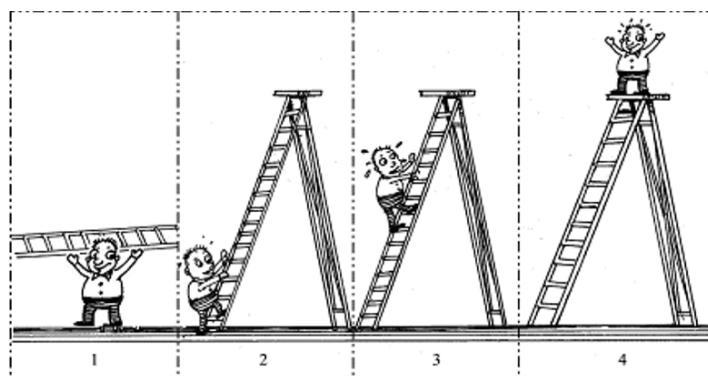


Figure 1.30

1.12.6.2.1 TEST

1. Write the following number in expanded notation:

$$6 \quad 498 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} +$$

$$= (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) \quad (4)$$

2. What is the value of the figures in bold print?

2.1 48 217

2.2 76 891

(2)

3. Provide the missing answers:

3.1 2 684 is 10 more than _____

3.2 16 437 is 100 less than _____

3.2 80 000 is 100 times more than _____ (3)

4. Complete the following number patterns:

4.1 7 380 ; 7 400 ; _____ ; _____

4.2 16 825 ; 16 800 ; _____ ; _____ (4)

5. Arrange the following numbers from small to large:

8 008 ; 8 800 ; 8 080 ; 8 808

(2) -----

6. Insert < ; > or = :

6.1 $4\ 876 * 4\ 000 + 700 + 80 +$ -----6.2 $(9 \times 8) + 4 * (81 \div 9)$ ----- (2)

7. Write the following number in words:

76 008

(1) -----

7.1 Write, using digits

sixty eight thousand four hundred and thirty nine

(1) -----

8. Round off:

8.1 to the nearest 100:

i) 1 764 -----

ii) 34 712 ----- (2)

8.2 to the nearest 1 000:

i) 4 632 -----

ii) 78 099 ----- (2)

9. Use the numbers in the block below to supply the missing answers:

| | | | | |
|----|----|----|----|----|
| 18 | 3 | 19 | 17 | 12 |
| 1 | 24 | 6 | 2 | 40 |

Figure 1.31

9.1 the multiples of 6

(2) -----

9.2 any two odd numbers

(1) -----

9.3 the factors of 12

(2) -----

9.4 any two prime numbers

(1) -----

9.5 any two even numbers

(1) -----

I have _____ out of 30!

Colour in: I feel

| |
|--------------------------|
| VERY HAPPY AND CONTENTED |
| HAPPY |
| UNHAPPY G |
| I CAN DO BETTER |

Table 1.13

1.12.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.1: We know this when the learner counts forwards and backwards in whole number intervals and fractions;

Assessment Standard 1.3: We know this when the learner recognises and represents numbers in order to describe and compare them:

1.13 To be able to count correctly¹³

1.13.1 MATHEMATICS

1.13.2 Number Concept, Addition and Subtraction

1.13.3 Addition

1.13.4 EDUCATOR SECTION

1.13.5 Memorandum

1.1 7

1.2 4

1.3 2

1.4 7

1.5 4

2.1 432; 214; 1 346; 1 020; 8 421; 6 045

2.2 512; 294; 1 426; 1 100; 6 125

2.3 1 482; 1 264; 2 396; 2 070; 9 471; 7 095

3.

¹³This content is available online at <<http://cnx.org/content/m22766/1.1/>>.

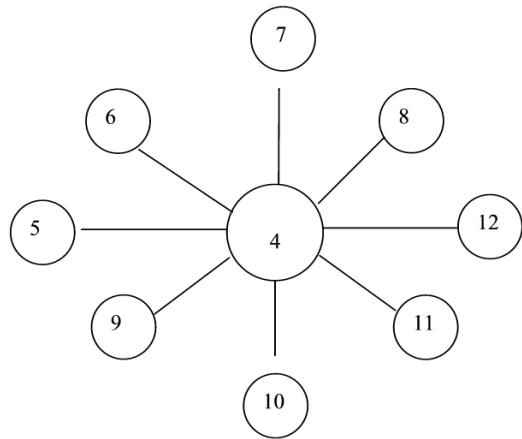


Figure 1.32

4.

4.1 26
4.2 66
4.3 34

4.4 44

4.5 94

4.6 49

4.7 49

4.8 351

4.9 368

4.10 9 984

4.11 32

4.12 48

4.13 48

4.14 6

4.15 24

4.16 96

4.17 132

4.18 7

4.19 15

4.20 44

5. 33 000; 43 000; 53 000; 63 000; 73 000; 83 000; 93 000; 103 000;
113 000; 123 000; 133 000

Leaner Section

1.13.6 Content

1.13.6.1 Activity: To be able to count correctly [LO 1.1]

1.13.6.2 To be able to calculate correctly [LO 1.8]

1.13.6.3 To be able to do mental arithmetic [LO 1.9]

1. In Mathematics it is important to count "visually". To be able to do this correctly, you must look carefully at the given figure. You must also read the questions carefully and with insight, because if you do not understand them, you will not count correctly! Let us start immediately with a challenge. Work with a friend and count:
-

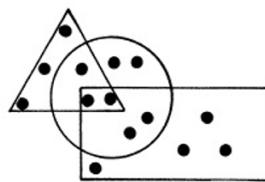


Figure 1.33

1.1 How many dots are there in the circle? -----

1.2 How many dots are there in the circle, and in the rectangle as well?

1.3 How many dots are there in the circle, and in the rectangle and the triangle as well?

1.4 How many dots are outside the circle? -----

1.5 How many dots are in the rectangle, but not in the circle or the triangle?

2. In the previous activity you counted with small numbers. Let us now use greater numbers. It is important that you know the value of each digit (as we did in the previous Learning Unit) before you start adding. This will help you calculate the answers correctly. See whether you or your friend can say the correct answer first. If you are not sure, check the answer with a calculator.

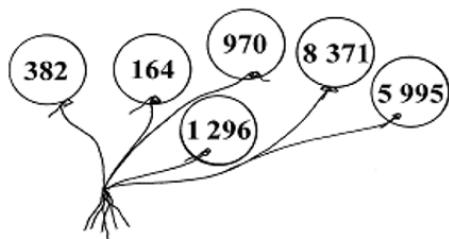


Figure 1.34

- 2.1 Add 50 to each balloon's number.
 2.2 Add 130 to each balloon's number.
 2.3 Add 100 to each balloon's number.
 3. Now see whether you can do the following!

Use each of the numbers 4 ; 5 ; 6 ; 7 ; 8 ; 9 ; 10 ; 11 and 12 once only, so that the sum of the 3 numbers in any direction is always 21.

4. It saves a lot of time if one does not have to solve a problem with pencil and paper every time. That is why it is so important that you must be able to think quickly! Work on your own and complete the arithmetic test as quickly and accurately as possible. You have only three minutes!

- a) $17 + 9 =$ _____
 b) $57 + 9 =$ _____
 c) $45 - 11 =$ _____
 d) $65 - 21 =$ _____
 e) Double 47: _____
 f) $17 + 19 + 13 =$ _____
 g) $23 + 19 + 7 =$ _____
 h) $210 + 120 + 21 =$ _____
 i) Double 184: _____
 j) $10\ 000 - 16 =$ _____
 k) Halve 64: _____
 l) Halve 96: _____
 m) $6 \times 8 =$ _____
 n) $54 \div 9 =$ _____
 o) One quarter of 96 = _____
 p) $12 \times 8 =$ _____
 q) _____ $\div 12 = 11$
 r) $63 \div$ _____ $= 9$
 s) $(15 \div 15) \times 15 =$ _____
 t) $(56 + 63) + 44 = 56 + (\underline{\hspace{2cm}} + 63)$

| HOW DID YOU FARE? | | |
|------------------------|-----------------------------|--|
| MARK THE RELEVANT BOX: | I had all right! | |
| | I had more than half right! | |
| | I did not do well enough. | |

Table 1.14

5. Now let us add even greater numbers. See if you can complete the following neatly and correctly. Start at 33 000 and add 10 000 at a time. Build yourself a "footpath" by colouring every block with the correct answer green.

| | | | | | | | |
|--------|--------|--------|--------|---------|---------|---------|---------|
| 33 000 | 40 000 | 58 000 | 85 000 | 93 000 | 102 000 | 110 000 | 133 000 |
| 38 000 | 43 000 | 60 000 | 83 000 | 96 000 | 103 000 | 111 000 | 123 000 |
| 41 000 | 53 000 | 62 000 | 73 000 | 99 000 | 107 000 | 113 000 | 121 000 |
| 32 000 | 55 000 | 63 000 | 71 000 | 100 000 | 109 000 | 116 000 | 119 000 |

Table 1.15

DO YOU STILL REMEMBER?

If we want to programme the calculator to check the previous sum, we key in $33\ 000 + 10\ 000 = = =$. Use your calculator to check whether your "footpath" has been calculated correctly.

1.13.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.1: We know this when the learner counts forwards and backwards in whole number intervals and fractions;

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems;

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.14 To use a series of techniques to do calculations¹⁴

1.14.1 MATHEMATICS

1.14.2 Number Concept, Addition and Subtraction

1.14.3 Addition

1.14.4 EDUCATOR SECTION

1.14.5 Memorandum

1. 262; 364; 466; 568; 670; 772; 874; 976; 1 078

2.

2.1 2 589; 2 592; 2 596; 2 598; 2 601; 2 604; 2 607

2.2 7 939; 8 039; 8 139; 8 239; 8 339; 8 439; 8 539

2.3 18 213; 28 213; 38 213; 48 213' 58 213; 68 213; 78 213; 88 213

Leaner Section

1.14.6 Content

1.14.6.1 Activity: To use a series of techniques to do calculations [LO 1.10]

1. The calculator is a wonderful aid for checking our calculations. If you know how to use the "constant function" of your calculator, an activity like the previous and following ones is child's play! See if you can complete the following arrow diagram with the aid of your calculator.

- What are you going to key in? _____

¹⁴This content is available online at <<http://cnx.org/content/m22768/1.1/>>.

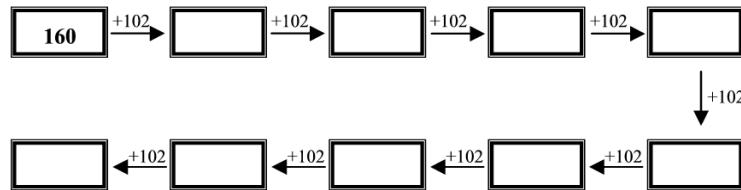


Figure 1.35

2. Use the constant function of your calculator again and write down the numbers that appear on the screen when you key in the following:

2.1 $2\ 586 + 3 = = = 2\ 607$

2.2 $2\ 7839 + 100 = = = 8\ 539$

2.3 $8\ 213 + 10\ 000 = = = 88\ 213$

You know by now that different peoples used different numerals to write down numbers. Let us take an in-depth look at the Romans' way of writing:

DO YOU STILL REMEMBER?

- In the previous module we saw that the Roman numerals differed from ours.

| | | | | | | | | | | |
|-----------------|---|----|-----|----|---|----|-----|------|----|----|
| Our numbers: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Roman numerals: | i | ii | iii | iv | v | vi | vii | viii | ix | x |

Table 1.16

1.14.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers.

1.15 To describe and illustrate different cultures' ways of writing¹⁵

1.15.1 MATHEMATICS

1.15.2 Number Concept, Addition and Subtraction

1.15.3 Addition

1.15.4 EDUCATOR SECTION

1.15.5 Memorandum

- 1.1 xi
- 1.2 xv
- 1.3 watches
- 2.
- 2.1 XLII
- 2.2 XCIX
- 2.3 MMDL
- 3.
- 3.1 608
- 3.2 65
- 3.3 3 257
- 4. Will differ from year to year

1.15.5.1 Brain Teaser

- 1. Move “minus” to just before “x” so that sum reads $1 \times 1 = 1$
 - 2. Take one away from = and add to – so that sum reads $1 = 111 - 11$
- Leaner Section

1.15.6 Content

1.15.6.1 Activity: To describe and illustrate different cultures' ways of writing [LO 1.2]

- Can you deduce from this how the Romans would have written 11?

1.2 How would they have written 15?

1.3 Where are these Roman numerals still used nowadays?

- Look carefully at the following:

| | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|------|-----|-------|
| We: | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| The Romans: | X | XX | XXX | XL | L | LX | LXX | LXXX | XC | C |
| We: | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1 000 |
| The Romans: | C | CC | CCC | CD | D | DC | DCC | DCCC | CM | M |

Table 1.17

¹⁵This content is available online at <<http://cnx.org/content/m22769/1.1/>>.

2. Use the information given above and calculate the following.

Write your answers in Roman numerals:

• $40 + 2$ _____

2.2 $90 + 9$ _____

2.3 $2\,000 + 500 + 50$ _____

3. You have just practised writing like the Romans. Below are more examples of how they would write certain numbers. Can you write them in ordinary (our) numbers?

3.1 DCVIII _____

3.2 LXV _____

3.3 MMMCCLVII _____

4. Write our present date in Roman numerals.

BRAIN TEASER

The matches below have been set out in Roman numerals, but the answers are incorrect. Can you “fix” each sum, so that the answer is correct, by moving only ONE match?

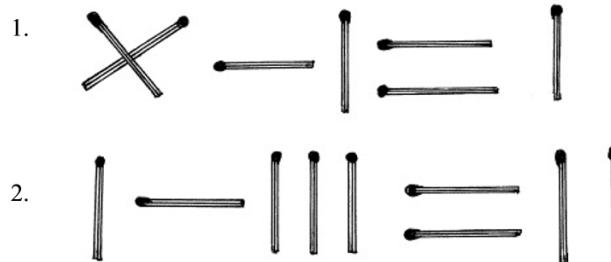


Figure 1.36

TIME FOR SELF-ASSESSMENT

Evaluate yourself on a scale of 1 - 4 by just drawing a circle around the figure that is true about yourself.

| I can | Not at all | Some-times | Most of the time | Always |
|---|------------|------------|------------------|--------|
| Use the constant function of my pocket calculator for repeated addition | 1 | 2 | 3 | 4 |
| <i>continued on next page</i> | | | | |

| | | | | |
|---|---|---|---|---|
| Write down Roman numerals for our numbers | 1 | 2 | 3 | 4 |
| Add and give the answer in Roman numerals | 1 | 2 | 3 | 4 |
| Write Roman numerals in ordinary numbers | 1 | 2 | 3 | 4 |

Table 1.18

However, the Roman counting system gets very complicated. The decimal system (OR METRIC SYSTEM) that we use is more practical. Let us consider the different ways in which we can add.

DO YOU REMEMBER?

- The answer of an addition sum is called the SUM OF THE TWO NUMBERS.
- The INVERSE (reverse) calculation of addition is SUBTRACTION.

DID YOU KNOW?

The order in which numbers are added makes no difference to the answer.

| | |
|--------------|-----------------|
| For example: | $5 + 4 = 4 + 5$ |
| | $9 = 9$ |

Table 1.19

| | |
|-------------|-----------------------------------|
| As well as: | $(16 + 14) + 12 = 16 + (14 + 12)$ |
| | $30 + 12 = 16 + 26$ |
| | $42 = 42$ |

Table 1.20

1.15.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.2: We know this when the learner describes and illustrates various ways of writing numbers in different cultures (including local) throughout history.

1.16 To recognise, describe and use laws¹⁶

1.16.1 MATHEMATICS

1.16.2 Number Concept, Addition and Subtraction

1.16.3 Addition

1.16.4 EDUCATOR SECTION

1.16.5 Memorandum

1.

$$1.1 9 + (8 + 7) = 24$$

$$1.2 121 + 32 = 153 / 140 + 13 = 153$$

$$1.3 338 + 100 = 438 / 396 + 42 = 438$$

Leaner Section

1.16.6 Content

1.16.6.1 Activity: To recognise, describe and use laws [LO 1.12]

1. Just as every country has certain laws to ensure good governance, there are "laws" or "characteristics" in Mathematics that can help you calculate answers more easily. There are, for example, the commutative and associative characteristics of addition. Complete the following and see how they work!

$$1.1 (9 + 8) + 7 = 9 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$1.2 121 + (19 + 13) = 121 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(121 + 19) + 13 = \underline{\hspace{2cm}} + 13 = \underline{\hspace{2cm}}$$

$$1.3 338 + (58 + 42) = 338 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$(338 + 58) + 42 = \underline{\hspace{2cm}} + 42 = \underline{\hspace{2cm}}$$

1.4 Discuss with your classmates: Which grouping of addition numbers was the easiest? Why?

1.16.6.1.1 DID YOU KNOW

When we want to add numbers, we can calculate the answer quickly by ROUNDING OFF the numbers!

1.16.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.12: We know this when the learner recognises, describes and uses.

1.12.3 the commutative, associative and distributive properties with whole numbers (the expectation is that learners should be able to use the properties, and not necessarily know the names).

¹⁶This content is available online at <<http://cnx.org/content/m22770/1.1/>>.

1.17 To estimate and calculate by selecting and using suitable operations¹⁷

1.17.1 MATHEMATICS

1.17.2 Number Concept, Addition and Subtraction

1.17.3 Addition

1.17.4 EDUCATOR SECTION

1.17.5 Memorandum

1. Look at the unit's digit.

If it is 5 or more, the tens digit becomes one more.

If it is 4 or less, the tens digit remains the same.

2. Look at the tens digit.

If it is 5 or more, the hundreds digit becomes one more.

If it is 4 or less, the hundreds digit remains unchanged.

3. Look at the hundreds digit.

If it is 5 or more, the thousands digit becomes one more.

If it is 4 or less, the thousands digit remains the same.

2.

$$2.1 \quad 20 + 10 + 20 = 50$$

$$2.2 \quad 30 + 10 + 50 = 90$$

$$2.3 \quad 10 + 20 + 20 = 50$$

$$2.4 \quad 100 + 200 + 300 = 600$$

$$2.5 \quad 200 + 100 + 100 = 400$$

3. “Estimated answer” and “Difference” will be different as a result of the method applied. Pocket calculator gives correct answer.

4.

a) 279

b) 1 660

c) 6 581

d) 2 843

5. Answers will vary – many combinations possible

6. $35 + 15; 47 + 3; 23 + 27$

$50 + 150; 25 + 175; 10 + 190; 180 + 20; 170 + 30$

$250 + 750; 400 + 600; 900 + 100; 200 + 800; 990 + 10$

6. $250 + 750; 125 + 825; 950 + 50; 450 + 550; 225 + 775; 415 + 585$

7. $5\ 000 + 400 + 80 + 9 + 300 + 60 + 2 + 1\ 000 + 500 + 70$

$$= (5\ 000 + 1\ 000) + (400 + 300 + 500) + (80 + 60 + 70 +) + (9 + 2)$$

$$= 6\ 000 + 1\ 200 + 210 + 11$$

$$= 7\ 421$$

¹⁷This content is available online at <<http://cnx.org/content/m22771/1.1/>>.

1.17.6 Leaner Section

1.17.7 Content

1.17.7.1 Activity: To estimate and calculate by selecting and using suitable operations [LO 1.8]

- Now practise your skill at estimating with confidence the answers by rounding off numbers.

1. It is important that we consider once again what rounding off is, and how it is done. Explain to a friend how we round off to the nearest 10, 100 and 1 000.

2. Now work in groups of three and see who is able to calculate the answers without a pocket calculator by rounding off to the closest 10 or 100. (You may not write anything down!)

$$2.1 \quad 16 + 11 + 19$$

$$2.2 \quad 34 + 9 + 52$$

$$2.3 \quad 2 + 15 + 23$$

$$2.4 \quad 141 + 208 + 339$$

$$2.5 \quad 182 + 149 + 106$$

3. Look carefully at the following example:

$32 + 87 + 96 + 42$ becomes

$30 + 90 + 100 + 40$ (rounded off to the closest 10)

Therefore the answer is approximately 260.

- When we want to add larger numbers, we can round off to the closest 100:

$138 + 759 + 304$ becomes

$100 + 800 + 300$

Therefore the answer will be roughly 1 200.

DID YOU KNOW?

- We can also round numbers off to a lower or upper limit!

e.g. $62 + 75 + 94 + 45$

Lower limit: $60 + 70 + 90 + 40 = 260$

Upper limit: $70 + 80 + 100 + 50 = 300$

The correct answer will therefore be between

260 and 300.

4. Now complete the table by rounding off the numbers according to the method that you prefer. Estimate the answer first. Then calculate the correct answer with a pocket calculator. Finally write down the difference between the two answers.

| | Calculation | Estimated answer | Calculator | Difference |
|------|---------------------|-------------------|------------|------------|
| E.g. | $308 + 475$ | $300 + 480 = 780$ | 783 | 3 |
| a) | $67 + 98 + 114$ | | | |
| b) | $896 + 723 + 41$ | | | |
| c) | $1\ 892 + 4\ 689$ | | | |
| d) | $2\ 458 + 294 + 91$ | | | |

Table 1.21

TIME FOR SELF-ASSESSMENT!

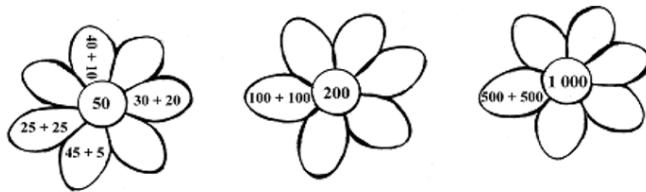
Colour the correct box:

| | | |
|--|----------|--------------------------|
| I am able to add by rounding off to the closest 10, 100 or 1 000 | mastered | ** have not mastered yet |
|--|----------|--------------------------|

Table 1.22

** Ask your educator to give you some more examples that you can do at home!!

5. There are also other techniques or computations (other than rounding off) that you can use to calculate answers quickly. Look carefully at the examples and try to add more number combinations.

**Figure 1.37**

6. Look at the numbers in the diagram below. By finding as many as possible addition strings that give a sum of 1 000, you can calculate the sum of all the numbers in a jiffy! How many do you see? Colour them in the same colour.

| | | | | | | |
|-----|-----|----|-----|-----|-----|-----|
| | | | 250 | | | |
| | | | 585 | | | |
| | | | 125 | | | |
| 750 | 825 | 50 | 950 | 550 | 775 | 415 |
| | | | 450 | | | |
| | | | 225 | | | |
| | | | 316 | | | |
| | | | 775 | | | |
| | | | 415 | | | |

Table 1.23

DO YOU STILL REMEMBER?

We can use grouping to add up. Look carefully at the example!

$$\begin{aligned}
 & \bullet = 370 + 245 + 684 \\
 & = 300 + 70 + 200 + 40 + 5 + 600 + 80 + 4 \\
 & = (300 + 200 + 600) + (70 + 40 + 80) + (5 + 4) \\
 & = 1\ 100 + 190 + 9 \\
 & \bullet = 1\ 299
 \end{aligned}$$

7. Use this method to calculate:

$$5\ 489 + 362 + 1\ 570$$

1.17.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems.

1.18 To solve problems in context¹⁸

1.18.1 MATHEMATICS

1.18.2 Number Concept, Addition and Subtraction

1.18.3 Addition

1.18.4 EDUCATOR SECTION

1.18.5 Memorandum

1.18.6 Learner Section

1.18.7 Content

1.18.7.1 Activity: To solve problems in context [LO 1.6]

1.18.7.2 To use a series of techniques to do calculations [LO 1.10]

1.18.7.3 To use strategies to check solutions [LO 1.11]

1. We have now investigated a few techniques to calculate answers. We encounter problems like those below every day. If we are unable to solve them, we will not be able to do calculations with much confidence! Form groups of three and try to solve the following problems. Your educator will supply the paper you need.

1.1 Dimitri and his friends decided to go to the “Bites-and-Bits” restaurant.

The menu is as follows:

Sandwiches:

Cheese R9,99

Ham and cheese R12,99

Egg R11,99

Tomato, ham and cheese R15,99

Chicken R15,99

Beverages:

Coke, Fanta, Sprite, Cream Soda R4,95

¹⁸This content is available online at <<http://cnx.org/content/m22772/1.1/>>.

Milkshake: Strawberry, Banana, Chocolate R8,⁹⁵

- Dimitri orders a ham and cheese sandwich and a strawberry milkshake.
- Vusi orders a chicken sandwich and a Coke.
- Nancy orders an egg sandwich and a chocolate milkshake.
- If Dimitri offers to pay the bill, how much will he have to pay?

1.2 Mr Zuma, Principal of the Perseverance Primary School, decides to replace the old floor tiles in the hall with new ones. The tiles are delivered and he asks the learners to carry them into the hall.

- The Grade 7's carry 1 893 tiles; the Grade 6's carry 976 tiles, the Grade 5's 824 tiles and the Grade 4's 769 tiles to the hall. How many tiles have been carried to the hall?
2. Explain your group's method of calculation to the class.
 3. Compare your methods. How do they differ?
 4. Use a pocket calculator to verify your answers.

1.18.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.6: We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues;

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers;

Assessment Standard 1.11: We know this when the learner uses a range of strategies to check solutions and judge the reasonableness of solutions.

1.19 To determine the equivalence and validity of different representations¹⁹

1.19.1 MATHEMATICS

1.19.2 Number Concept, Addition and Subtraction

1.19.3 Addition

1.19.4 EDUCATOR SECTION

1.19.5 Memorandum

1.1 Counting on

- 1.2 Take away 11 400 every time and add the rest
- 1.3 Keep 1 000s, 100s and 10s apart and add
- 1.4 Counting on: first 10 000s, then 1 000s, then 100s, then 10s and lastly units
- 1.5 Self-explanatory
- 1.6 Carry over method
2. Own answer
- 3.2 Short method of addition, without carry over numbers

¹⁹This content is available online at <<http://cnx.org/content/m22821/1.1/>>.

3.3

a) 83 320

b) 105 935

Leaner Section

1.19.6 Content

1.19.7 Activity: To determine the equivalence and validity of different representations [LO 2.6]

1.19.8 To use strategies to check solutions [LO 1.11]

1. In Activity 2.6 you used your own techniques and strategies to solve the problems.

DID YOU KNOW?

- There are many other ways in which we can add numbers. Form six groups. Each group must discuss one of the following methods and then explain how the answer is calculated.

1.1 I calculate $11\ 468 + 23\ 957$ like this:

$$\begin{aligned}11\ 468 + 20\ 000 &\rightarrow 31\ 468 + 3\ 000 \rightarrow 34\ 468 + 900 \\35\ 368 + 50 &\rightarrow 35\ 418 + 7 = 35\ 425\end{aligned}$$

1.2 I prefer to calculate the answer as follows:

$$\begin{aligned}11\ 468 + 23\ 957 &= (11\ 400 + 11\ 400) + (68 + 12\ 557) \\&= (11\ 400 + 11\ 400 + 11\ 400) + (68 + 1\ 157) \\&= 34\ 200 + 1\ 225 \\&= 35\ 425\end{aligned}$$

1.3 Look carefully! This is how I do it!

$$\begin{array}{r}11\ 468 + 23\ 957 = 11\ 000 + 400 + 60 + 8 \\+ 23\ 000 + 900 + 50 + 7 \\ \hline 34\ 000 + 1\ 300 + 110 + 15 \\= 35\ 000 + 410 + 15 \\= 35\ 425\end{array}$$

Figure 1.38

1.4 My method of addition looks like this:

$$11\ 468 + 23\ 957 =$$

$$10\ 000 + 20\ 000 \rightarrow 30\ 000 + 1\ 000 + 3\ 000$$

$$34\ 000 + 400 + 900 \rightarrow 35\ 300 + 60 + 50$$

$$35\ 410 + 8 + 7 = 35\ 425$$

1.5 I work like this:

$$\begin{array}{r}
 11\,468 + 23\,957 = 11\,468 \\
 \quad + 23\,957 \\
 \hline
 \quad \quad 15 \text{ (add units)} \\
 \quad \quad 110 \text{ (add tens)} \\
 \quad 1\,300 \text{ (add hundreds)} \\
 \quad 4\,000 \text{ (add thousands)} \\
 + 30\,000 \text{ (add ten thousands)} \\
 \hline
 \quad \quad \quad 35\,425
 \end{array}$$

Figure 1.39

1.6 I find it best to write it down like this:

$$11\ 468 + 23\ 957:$$

$$\begin{array}{r}
 & 1\,000 & 100 & 10 \\
 10\,000 & + & 1\,000 & + & 400 & + & 60 & + & 8 \\
 + 20\,000 & + & 3\,000 & + & 900 & + & 50 & + & 7 \\
 \hline
 30\,000 & + & 5\,000 & + & \Phi 400 & + & \Phi 20 & + & \Phi 5
 \end{array}$$

$= 30\,000 + 5\,000 + 400 + 20 + 5$
 $= 35\,425$

Figure 1.40

2. Which method do you find easiest? Motivate your answer.

3. Work with a friend and study the following method:

$$11\ 468 + 23\ 957: \quad \begin{array}{r} 1\ 1\ 4\ 6\ 8 \\ + 2\ 3\ 9\ 5\ 7 \\ \hline 3\ 5\ 4\ 2\ 5 \end{array}$$

Figure 1.41

- ### 3.2 Explain the method to another friend.

- 3.3 Now use this method to calculate the sum of the following:

a) $35\ 691 + 47\ 629$

b) $82\ 179 + 23\ 756$

1.19.9 SELF-ASSESSMENT

Let us see how you have done!

Mark the relevant box:

| | | | |
|--------------|------------------|----------------------|-----------------------------------|
| I understand | all the methods. | most of the methods. | **only one or two of the methods. |
|--------------|------------------|----------------------|-----------------------------------|

Table 1.24

** Ask the members of your group / your educator to explain it to you again.

1.19.10 BRAIN TEASER

Work in groups of 4. Can you think of any OTHER methods to calculate the sum of $11\ 468 + 23\ 957$?

1.19.11 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.11: We know this when the learner counts forwards and backwards in whole number intervals and fractions;

Learning Outcome 2: The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

Assessment Standard 2.6: We know this when the learner determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule presented.

1.20 To use a series of techniques to do calculations²⁰

1.20.1 MATHEMATICS

1.20.2 Number Concept, Addition and Subtraction

1.20.3 Addition

1.20.4 EDUCATOR SECTION

1.20.5 Memorandum

Leaner Section

²⁰This content is available online at <<http://cnx.org/content/m22822/1.1/>>.

1.20.6 Content

1.20.6.1 Activity: To use a series of techniques to do calculations [LO 1.10]

- When you use a certain technique in a calculation it must be one you understand completely and one that saves you time. Now use any method to determine what amount you must pay for all your shopping.



Figure 1.42

1.20.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers.

1.21 To be able to do mental arithmetic²¹

1.21.1 MATHEMATICS

1.21.2 Number Concept, Addition and Subtraction

1.21.3 Addition

1.21.4 EDUCATOR SECTION

1.21.5 Memorandum

- 1.1 830
- 1.2 14
- 1.3 12
- 1.4 99
- 1.5 27
- 1.6 12 and a half
- 1.7 84
- 1.8 185
- 1.9 196
- 1.10 64
- 1.11 29 and a half
- 1.12 5
- 1.13 7
- 1.14 158
- 1.15 60
- 1.16 7
- 1.17 8
- 1.18 80
- 1.19 0
- 1.20 170

1.21.6 Learner Section

1.21.7 Content

1.21.7.1 Activity: To be able to do mental arithmetic [LO 1.9]

- In this activity it is time again for YOU to rack your brains a bit and to try to enhance your mental arithmetic abilities. See whether you can write down the correct answers of the mental arithmetic test within three minutes!

- a) $550 + 280 = \underline{\hspace{2cm}}$
- b) $18 + \underline{\hspace{2cm}} = 32$
- c) $28 + \underline{\hspace{2cm}} = 40$
- d) $105 - 6 = \underline{\hspace{2cm}}$
- e) $3 \times 3 \times 3 = \underline{\hspace{2cm}}$
- f) Halve van 25 = $\underline{\hspace{2cm}}$
- g) $\underline{\hspace{2cm}} \div 12 = 7$
- h) $193 - 8 = \underline{\hspace{2cm}}$
- i) $203 - 7 = \underline{\hspace{2cm}}$
- j) Halve 128: $\underline{\hspace{2cm}}$

²¹This content is available online at <<http://cnx.org/content/m22826/1.1/>>.

- k) Halve 59: _____
- l) $20 \div \underline{\hspace{2cm}} = 4$
- m) $63 \div \underline{\hspace{2cm}} = 9$
- n) Double 79: _____
- o) $(6 \times 9) + 6 = \underline{\hspace{2cm}}$
- p) $(7 \times 8) + \underline{\hspace{2cm}} = 63$
- q) $(\underline{\hspace{2cm}} \times 5) + 9 = 49$
- r) $2 \times 20 \times 2 = \underline{\hspace{2cm}}$
- s) $\underline{\hspace{2cm}} \times 12 + 12 = 12$
- t) Double 85: _____

| HOW DID YOU FARE? | | |
|------------------------|---|--|
| MARK THE RELEVANT BOX: | I improved on my previous mental calculation test. | |
| | My marks stayed the same. | |
| | The marks of my previous mental calculation test were better. | |

Table 1.25

1.21.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.22 To use techniques to do calculations²²

1.22.1 MATHEMATICS

1.22.2 Number Concept, Addition and Subtraction

1.22.3 Addition

1.22.4 EDUCATOR SECTION

1.22.5 Memorandum

2. 1.3 1 236
 3.1 $10\ 876 + 23\ 982 \text{ M+}$
 $43\ 567 + 21\ 309 \text{ M+}$
 $\text{RM} = 130\ 254$
 3.2 $42\ 861 + 13\ 579 \text{ M+}$

²²This content is available online at <<http://cnx.org/content/m22828/1.1/>>.

$49\ 478 + 24\ 336 \text{ M+}$

$\text{RM} = 130\ 254$

4. $2 \times 17.99 \text{ M+}$

$3 \times 14.99 \text{ M+}$

$2 \times 6.98 \text{ M+}$

$2 \times 16.99 \text{ M+}$

$\text{RM} = 128.89$

1.22.6 Leaner Section

1.22.7 Content

1.22.7.1 Activity: To use techniques to do calculations [LO 1.10]

DID YOU KNOW?

You can use the memory keys of your pocket calculator to do calculations containing more than one operation, correctly!

1. Look for the following keys on your pocket calculator: M+ ; MR or RCM

2. Look carefully at the example:

$(168 + 423) + (256 + 389)$

2.1 Press $168 + 423 = \text{M+}$

2.2 Then press $256 + 389 = \text{M+}$

2.3 Then press MR or RCM

What is the answer?

TAKE NOTE:

The M+-key makes it possible for the calculator to memorise or store the answer.

The MR (Memory Recall) or RCM (ReCall Memory) key is used when you want to recall all the memorised answers.

3. Use your pocket calculator's memory to calculate:

3.1 $(10\ 876 + 23\ 982) + (43\ 567 + 21\ 309)$

3.2 $(42\ 861 + 13\ 579) + (49\ 478 + 24\ 336)$

4. Look at the till slip of the Stay Healthy Chemist. Use the memory of your pocket calculator to calculate the total cost of your purchases.

| STAY HEALTHY CHEMIST | | | |
|-----------------------------|--------|-------------------------------|--------|
| Tel. 919-2561 Fax. 919-2562 | | 3 Short Street Bellville 7530 | |
| | | | |
| Item | Number | Price | Amount |
| Vitamin tablets | 2 | R17,99 | ----- |
| Toothbrush | 3 | R14,99 | ----- |
| Tissues | 2 | R 6,98 | ----- |
| Shampoo | 2 | R16,99 | ----- |

Table 1.26

1.22.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers;

- 1.10.1 adding and subtracting in columns;
 - 1.10.2 building up and breaking down numbers;
 - 1.10.3 rounding off and compensating;
 - 1.10.5 using a calculator.

1.23 To solve in context problems that concern economic issues²³

1.23.1 MATHEMATICS

1.23.2 Number Concept, Addition and Subtraction

1.23.3 Addition

1.23.4 EDUCATOR SECTION

1.23.5 Memorandum

Answers may differ

tEST 2

- 1493
- 469 + 1 426

2.1 34 367

2.2 24 809

3. 300; 436; + 47; 751

4.1 1 3900

4.2 29 100

5. 39018

6. R3 216,72

7. $3,260\,3915 + 23\,684\,193 = 23\,684\,196$

1.23.6 Total: 20

1.23.7 Learner Section

1.23.8 Content

1.23.8.1 Activity: To solve in context problems that concern economic issues [LO 1.6]

1. Cash register slips are part of our lives. Wherever we buy and pay, we receive them. Let us take a closer look at a couple of them!

Your educator will provide you with the necessary paper.

Divide into groups of three. Collect at least three till slips from various shops in your area (you may collect more!) and compare them in terms of the following:

1.1

Lay-out: Where is the name of the shop written?

Is there an address? Where is it written?

Is there a telephone number? Where is it written?

Is there a fax number? Where is it written?

1.2 What, in addition to the above, is also indicated on the till slip?

1.3 Are there any similarities between the various till slips? If yes, what?

1.4 Are there any differences between the various till slips? If yes, what?

1.5 Which till slip is "best" according to you? Motivate your answer.

²³This content is available online at <<http://cnx.org/content/m22831/1.1/>>.

| ASSESSMENT: TILL SLIPS | | | | |
|---------------------------|---|--|---|--|
| | 1 | 2 | 3 | 4 |
| Co-operation with others | Does not co-operate effectively | Co-operates, but has to be prompted frequently | Co-operates, but does not listen to opinions expressed by group members | Co-operates beautifully and listens to suggestions made by group members |
| Tidiness and organisation | Work is untidy and disorganised | Organised, but difficult to read | Neat and organised, easily legible | Neat, clearly laid out work; easily legible |
| Completeness | Fewer than 3 till slips. Not all questions answered | A lot of information omitted | Only a few questions were not answered | Assignment executed completely |

Table 1.27

CHALLENGE!

Can you solve the following letter sum?

$$\begin{array}{r}
 \text{T A K} \\
 + \text{T A K} \\
 \hline
 \text{P O T}
 \end{array}$$

Each letter represents a different digit from 1 to 9. Find values for A, K, O, P and T.

(There are 13 possible solutions!)

1.23.8.1.1 TEST

1. Complete:

$$\begin{aligned}
 1.1 & 1\ 1\ 493 + 1\ 268 = 1\ 268 + \underline{\hspace{3cm}} \\
 1.2 & (318 + 469) + 1\ 426 = 318 + (\underline{\hspace{1cm}} + \underline{\hspace{1cm}}) \\
 & = \underline{\hspace{3cm}} \quad (3)
 \end{aligned}$$

2. Add the numbers in each bubble.

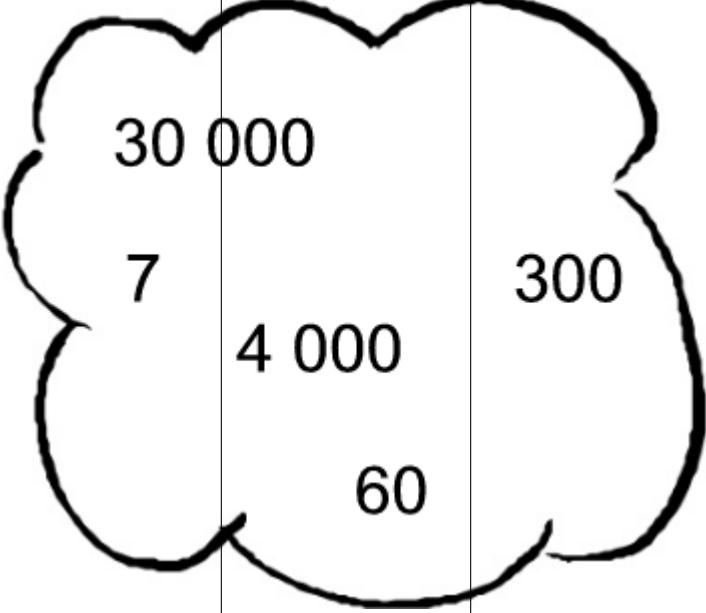
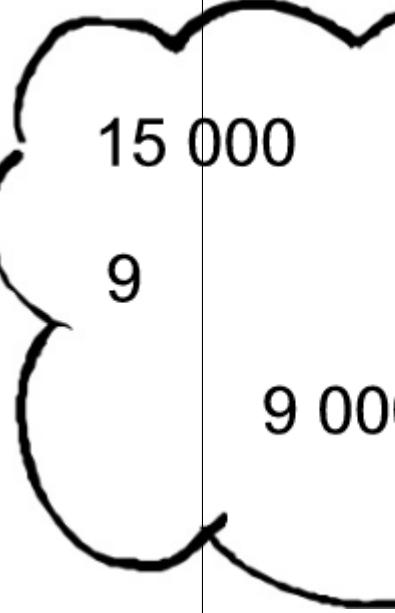
| 2.1 | | | 2.2 | |
|-----|--|--|---|--|
| | |  | | |
| | | |  | |

Table 1.28

- (2)
3. Complete:



Figure 1.43

(4)

4. Estimate the sum of the following by rounding off to the nearest 100:

4.1 $7\ 684 + 6\ 207$ -----

4.2 $15\ 216 + 13\ 899$ ----- (2)

5. Use any method of your choice and calculate the sum of:

5.1 $38\ 962 + 56\ 149$

(2)

6. Dad pays R899,95 for water and electricity; R438,27 for the telephone and R1 878,50 for groceries. What is the total amount Dad must pay?
-
-
-
-
-
-

(3)

7. Use the memory of your pocket calculator and calculate:

$$(48\ 632 \div 14\ 916) + (23\ 684 + 56\ 193)$$

(4)

TOTAL: 20

1.23.9

1.23.10

1.23.11 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.6: We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as:

1.6.1 financial (including buying and selling, profit and loss, and simple budgets).

1.24 To be able to do mental arithmetic²⁴

1.24.1 MATHEMATICS

1.24.2 Number Concept, Addition and Subtraction

1.24.3 Subtraction

1.24.4 EDUCATOR SECTION

1.24.5 Memorandum

2. Subtraction

3.1 8

²⁴This content is available online at <<http://cnx.org/content/m22871/1.1/>>.

- 3.2 28
 - 3.3 47
 - 3.4 40
 - 3.5 340
 - 3.6 3 580
 - 3.7 18 200
 - 3.8 18 050
 - 3.9 10 250
 - 3.10 8 250
 - 3.11 18
 - 3.12 14
 - 3.13 8
 - 3.14 12
 - 3.15 45
 - 3.16 450
 - 3.17 350
 - 25 000
- 3.19 1 500
 3.20 250
 Leaner Section

1.24.6 Content

1.24.6.1 Activity: To be able to do mental arithmetic [LO 1.9]

1. It is often necessary for us to be able to add or subtract quickly. We must always try to find "shortcuts" for mental arithmetic. Can you think of a quick way of subtracting 9 from a number, for instance? (See who in your class has got the most effective method for this!)

2. Now are you ready for action? Subtract 9 from the following numbers. Find the matching answer in the wheel and write the letter that is paired with it in the space below, to show what this learning unit covers!

| | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|
| 18 | 31 | 22 | 47 | 25 | 34 | 24 | 47 | 43 | 26 | 14 |
| | | | | | | | | | | |

Table 1.29

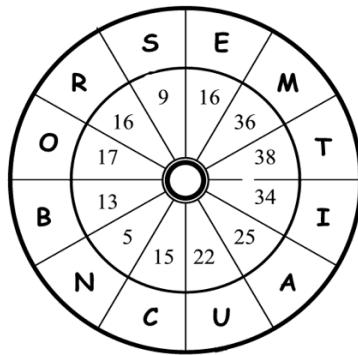


Figure 1.44

- Write your answer here:
- -----

- Do you still recognise these?

In $468 - 231 = 237$ we refer to

468 as the minuend

231 as the subtrahend

237 as the difference

| | | | | | | |
|-------|---------|---|------------|---|------------|--|
| Thus: | 468 | - | 231 | = | 237 | |
| | | | | | | |
| | minuend | | subtrahend | | difference | |

Table 1.30

- Do you also remember?

The INVERSE (reverse calculation) of subtraction is ADDITION.

If you therefore want to check a subtraction sum, you can add.

3. Let's practise your skills in mental arithmetic again! Subtract the following as quickly as possible. If you know your place values (refer to Learning Unit 1) it will be child's play.

2.1 $17 - 9 =$ -----

2.2 $37 - 9 =$ -----

2.3 $97 - 50 =$ -----

2.4 $97 - 57 =$ -----

2.5 $360 - 20 =$ -----

2.6 $3600 - 20 =$ -----

2.7 $18250 - 50 =$ -----

- 2.8 $18\ 250 - 200 =$ -----
 2.9 $18\ 250 - 8\ 000 =$ -----
 2.10 $18\ 250 - 10\ 000 =$ -----
 2.11 ----- $- 9 = 9$
 2.12 ----- $- 8 = 6$
 2.13 $21 -$ ----- $= 13$
 2.14 $42 -$ ----- $= 30$
 2.15 $90 -$ ----- $= 45$
 2.16 $900 -$ ----- $= 450$
 2.17 $900 -$ ----- $= 550$
 2.18 ----- $- 6\ 000 = 19\ 000$
 2.19 $21\ 500 -$ ----- $= 20\ 000$
 2.20 $25\ 750 -$ ----- $= 25\ 500$

- Complete by ticking in the applicable column.

| | | NOT AT ALL | | ONLY A LITTLE | | A LOT | | VERY MUCH |
|---|--|------------|--|---------------|--|-------|--|-----------|
| I struggle to subtract quickly and accurately | | | | | | | | |
| I struggle to subtract quickly | | | | | | | | |
| I struggle to subtract correctly | | | | | | | | |

Table 1.31

1.24.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.9: We know this when the learner performs mental calculations.

1.25 To describe and illustrate different cultures' ways of writing²⁵

1.25.1 MATHEMATICS

1.25.2 Number Concept, Addition and Subtraction

1.25.3 Subtraction

1.25.4 EDUCATOR SECTION

1.25.5 Memorandum

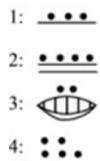


Figure 1.45

$$2.1 \quad 19 - 7 - 2 = 10$$

$$2.2 \quad 21 - 11 - 4 = 6$$

$$2.3 \quad 20 - 3 - 5 - 6 = 6$$

Leaner Section

1.25.6 Content

1.25.6.1 Activity: To describe and illustrate different cultures' ways of writing [LO 1.2]

- Did you know?

The Mayas of Central America used numbers like these:

²⁵This content is available online at <<http://cnx.org/content/m22872/1.1/>>.

| | | | |
|----|---------|-----|--------|
| 1: | • | 10: | ===== |
| 2: | •• | 11: | •===== |
| 3: | ••• | 15: | ===== |
| 4: | •••• | 16: | •===== |
| 5: | ===== | 19: | =====• |
| 6: | •===== | 20: | •===== |
| 7: | ••===== | 21: | •• |

Figure 1.46

1. We have already looked at how the Romans wrote. Now look closely at the writing of the Maya Indians above and answer the following questions:

| | |
|---------------|---------------|
| 1.1 8: | 1.3 40: |
| 1.2 14: | 1.4 43: |

Table 1.32

2. Calculate the following. Write your answers as we would write it.

2.1 - - =

2.2 - - =

2.3 - - - =

Figure 1.47

1.25.7 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.2: We know this when the learner describes and illustrates various ways of writing numbers in different cultures (including local) throughout history.

1.26 To use a series of techniques to be able to do calculations²⁶

1.26.1 MATHEMATICS

1.26.2 Number Concept, Addition and Subtraction

1.26.3 Subtraction

1.26.4 EDUCATOR SECTION

1.26.5 Memorandum

1.26.6 Learner Section

1.26.7 Content

1.26.7.1 Activity: To use a series of techniques to be able to do calculations [LO 1.10]

1. A pocket calculator is very helpful in calculating answers, but it is useless if one does not understand what one reads. Work with a friend. Follow the steps of the flow diagrams and draw a circle around the first correct answer. First make sure that you know what to do!

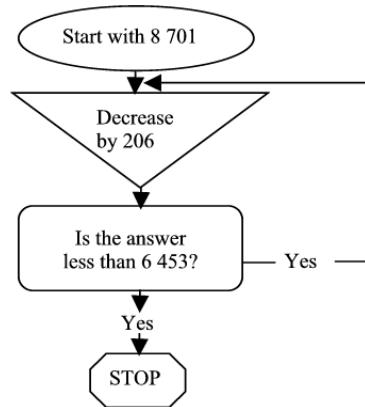


Figure 1.48

- a)
- b)

²⁶This content is available online at <<http://cnx.org/content/m22873/1.1/>>.

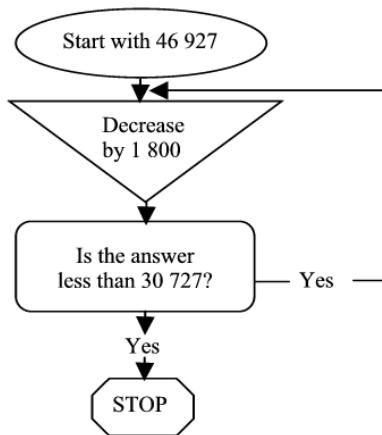


Figure 1.49

1.26.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of techniques to perform written and mental calculations with whole numbers.

1.27 To examine and expand numeric patterns²⁷

1.27.1 MATHEMATICS

1.27.2 Number Concept, Addition and Subtraction

1.27.3 Subtraction

1.27.4 EDUCATOR SECTION

1.27.5 Memorandum

1.1 6 550; 6 400; 6 250

1.2 14 345; 14 330; 14 285

1.3 122 500; 122 000; 120 500

Leaner Section

1.27.6 Content

1.27.6.1 Activity: To examine and expand numeric patterns [LO 2.1]

- Do you still remember how to find "patterns" in number rows? (Learning Unit 1) Work on your own - without a calculator - and see whether you can complete the following number patterns correctly:

²⁷This content is available online at <<http://cnx.org/content/m22874/1.1/>>.

- 1.1 6 850 ; 6 700 ; 6 550 ;;
 1.2 14 360 ; ; ; 14 315 ; 14 300 ;
 1.3 122 500 ; ; 121 500 ; 121 000 ;

1.27.7 Assessment

Learning Outcome 2: The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

Assessment Standard 2.1: We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns:

- 2.1.1 represented in physical or diagrammatic form.

1.28 To determine the output values for given input values²⁸

1.28.1 MATHEMATICS

1.28.2 Number Concept, Addition and Subtraction

1.28.3 Subtraction

1.28.4 EDUCATOR SECTION

1.28.5 Memorandum

- 1.
- a) 40
 - b) 420
 - c) 1 780
 - d) 24 270
3. less 40 because $19 + 1 = 20$ and $21 - 1 = 20$

1.28.5.1 PUZZLE

- a) 41 and 42
- b) 118 and 119
- c) 88 and 89
- d) 100 and 101

1.28.6 Learner Section

1.28.7 Content

1.28.7.1 Activity: To determine the output values for given input values [LO 2.3]

1. Below is an example of a flow diagram. The numbers on the left are called input values, and the answers you have to provide are called output values. See whether you can complete the flow diagram without the help of a calculator.

²⁸This content is available online at <<http://cnx.org/content/m22875/1.1/>>.

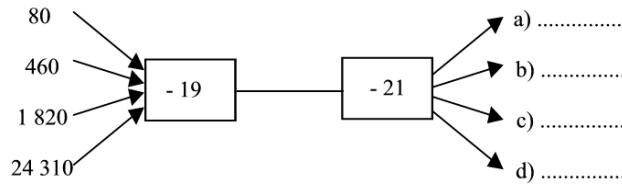


Figure 1.50

2. Use a pocket calculator to check you answers.
 3. How could you calculate the answers WITHOUT first subtracting 19 and then 21?
-
-
-

A PUZZLE

Consecutive numbers are numbers that follow directly after one another when you count, e.g. 22 and 23. Show whether you are able to figure out what the missing consecutive numbers are that will make the following number sentences true:

consecutive numbers

a) $286 - \boxed{\quad} - \boxed{\quad} = 203$

b) $1\,392 - \boxed{\quad} - \boxed{\quad} = 1\,155$

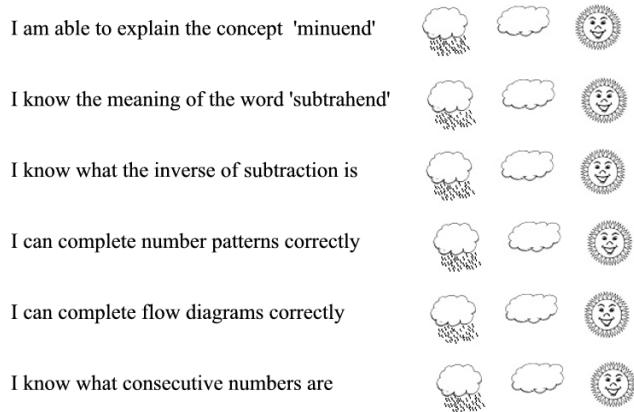
c) $46\,213 - \boxed{\quad} - \boxed{\quad} = 46\,036$

d) $238\,014 - \boxed{\quad} - \boxed{\quad} = 237\,813$

Figure 1.51

TIME TO DO SELF-ASSESSMENT

- Colour in the picture that is true for you:

**Figure 1.52**

1.28.8 Assessment

Learning Outcome 2: The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

Assessment Standard 2.3: We know this when the learner determines output values for given input values, using:

- 2.3.1 verbal descriptions;
- 2.3.2 flow diagrams.

1.29 To calculate by using selected computations²⁹

1.29.1 MATHEMATICS

1.29.2 Number Concept, Addition and Subtraction

1.29.3 Subtraction

1.29.4 EDUCATOR SECTION

1.29.5 Memorandum

1.1 (a) 510 (b) 810 (c) 860 (d) 1 400 (e) 1 860

1.2 (a) 800 (b) 300 (c) 2 500 (d) 1 700

2.2

a) $16\ 00 - 10\ 000 = 6\ 000$

b) $98\ 000 - 46\ 000 = 52\ 000$

c) $642\ 000 - 23\ 6000 = 406\ 000$

d) $926\ 000 - 759\ 000 = 167\ 000$

e) $2468000 - 1129000 = 1339000$

²⁹This content is available online at <<http://cnx.org/content/m22876/1.1/>>.

1.29.6 Leaner Section

1.29.7 Content

1.29.7.1 Activity: To calculate by using selected computations [LO 1.8]

1. As with addition we can subtract more easily by rounding off numbers. In this way we estimate what the answer should be approximately! Work with a friend. Take turns to say the answers out loud to each other. Check the answers with a calculator. Feel free to ask your educator's help where needed.

1.1 Subtract by rounding off both numbers to the nearest 10:

- a) $567 - 63$
- b) $901 - 87$
- c) $885 - 25$
- d) $1\ 454 - 49$
- e) $1\ 999 - 138$

1.2 Round both numbers to the nearest 100 and subtract:

- a) $973 - 214$
- b) $1\ 259 - 993$
- c) $6\ 048 - 3\ 512$
- d) $9\ 999 - 8\ 234$

2. Let us look at different ways in which the difference between big numbers can be calculated!

2.1 Can you still remember?

Explain to friend how to round off to the nearest 1 000.

2.2 Complete the table by rounding off to the nearest 1 000:

| | NUMBER 1 | NUMBER 2 | DIFFERENCE |
|--------------------------------|----------|----------|------------|
| e.g. $4\ 386 - 1\ 274$ | 4 000 | 1 000 | 3 000 |
| a) $15\ 980 - 9\ 621$ | | | |
| b) $98\ 102 - 46\ 147$ | | | |
| c) $642\ 368 - 236\ 419$ | | | |
| d) $926\ 135 - 758\ 910$ | | | |
| e) $2\ 468\ 265 - 1\ 128\ 651$ | | | |

Table 1.33

1.29.8 Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.8: We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems;

1.8.1 rounding off to the nearest 5, 10, 100 or 1 000;

1.8.2 addition and subtraction of whole numbers with at least five digits.

Chapter 2

Term 2

2.1 Multiplication¹

2.1.1 MATHEMATICS

2.1.2 Grade 5

2.1.3 MULTIPLICATION AND DIVISION

2.1.4 Module 32

2.1.5 MULTIPLICATION

2.1.5.1 Activity 1:

2.1.5.2 To recognise and represent the multiples of single-digit numbers [LO 1.3.6]

I think you already know how important it is to know your tables well. In this learning unit it will help you to multiply quickly and correctly. Let us see how well you know your tables.

1. Take the fruit-shaped sweets containing the correct answers out of the jar. Colour them in neatly and then write down the letter of the alphabet written on it. Use these letters to complete the sentence:

_____ is a shorter way of doing repeated addition.

1.1 5×4

1.2 2×3

1.3 7×7

1.4 7×4

1.5 5×5

1.6 7×3

1.7 6×4

1.8 9×2

1.9 9×7

1.10 9×9

1.11 7×6

1.12 3×5

1.13 8×8

1.14 12×4

1.15 6×12

1.16 9×12

¹This content is available online at <<http://cnx.org/content/m30815/1.1/>>.

$1.17\ 6 \times 6$



Figure 2.1

2.1.5.3 Activity 2:

2.1.5.4 To recognise and represent the factors of at least any two-digit whole number [LO 1.3.7]

1. Now that you know exactly what *factors* are, you are probably able to see their important function in multiplication. Factors also help us to test our answers when we multiply. Yes, you are right! We use them when we divide in order to test whether we have multiplied correctly. Now see how many pairs of factors you can write down for the following numbers.

| | |
|------------------------------|------------------------------|
| a) $24 = \dots \times \dots$ | b) $36 = \dots \times \dots$ |
| $= \dots \times \dots$ | $= \dots \times \dots$ |
| $= \dots \times \dots$ | $= \dots \times \dots$ |
| $= \dots \times \dots$ | $= \dots \times \dots$ |
| | $= \dots \times \dots$ |

Table 2.1

2. Let us do some more exercises, using factors. Look at the products (numbers) and then write down suitable factors for them. The first one has been done for you.

| | | | | |
|--------------|-------|-------|-------|-------|
| 42 | 45 | 63 | 54 | 64 |
| 7×6 | ..... | ..... | ..... | ..... |
| 72 | 108 | 48 | 88 | 96 |
| | | | | |

Table 2.2

DO YOU STILL REMEMBER?

When you multiply any number by **0**, the answer is always **0**. ($0 \times 6 = 0$)
Any number multiplied by **1**, is **that** number. ($9 \times 1 = 9$)

2.1.5.5 Activity 3:

2.1.5.6 To be able to do mental arithmetic [LO 1.9.2]

Now the factors are supplied to you. All you have to do in your first mental arithmetic test is to complete the multiplication block by writing down the missing answers only. Easy, isn't it?

| X | 4 | 5 | 6 | 7 | 8 | 9 | 12 |
|---|-------|-------|-------|-------|-------|-------|-------|
| 5 | 20 | ..... | 30 | ..... | 40 | ..... | 60 |
| 6 | ..... | 30 | 36 | 42 | ..... | 54 | ..... |
| 7 | 28 | ..... | 42 | ..... | 56 | ..... | 84 |
| 8 | ..... | 40 | ..... | 56 | ..... | 72 | ..... |
| 9 | ..... | ..... | 54 | ..... | 72 | ..... | 108 |
| 2 | 48 | 60 | ..... | 84 | ..... | 108 | ..... |

Table 2.3

2.1.5.7 Activity 4:**2.1.5.8 To describe and illustrate different ways of writing in different cultures [LO 1.2]**

By **doubling** numbers we can find the answer to a multiplication sum much more easily. Here we can learn from the Egyptians. Work with a friend and see whether you are able to find out how this calculation was done.

$$28 \times 324$$

| | | |
|-------------------------|-------|------------|
| 1 × 324: | 324 | (1 × 324) |
| Double 324: | 648 | (2 × 324) |
| Double 1 648: | 1 296 | (4 × 324) |
| Double 1 296: | 2 592 | (8 × 324) |
| Double 2 592: | 5 184 | (16 × 324) |
| Thus: $28 \times 324 =$ | 9 072 | |

Table 2.4

BRAIN-TEASER!

Calculate the following in the same way as the Egyptians did thousands of years ago:

$$15 \times 241$$

- Is there an easier way of doing it? Discuss this with your friend. Check your answer with a calculator.

DID YOU KNOW?

Thus we can also make use of DOUBLING when we want to multiply:

$$2 \times 280 = (200 + 200) + (80 + 80)$$

$$= 400 + 160$$

$$= 560$$

2.1.5.9 Activity 5:**2.1.5.10 To use a series of techniques to do computations with whole numbers [LO 1.10.4]**

1. If you looked carefully at the example above, you would have seen that this method of doubling differs from that of the Egyptians. Can you calculate the following by doubling it in exactly the same way?

$$1.1 \ 2 \times 1\ 430 =$$

$$1.2 \quad 2 \times 2 \quad 315 =$$

2. We would very much like to use the shortest possible method in Mathematics, because it saves a lot of time, trouble and paper. Calculate the product again by doubling, but this time use a shorter method if you can.

$$2.1 \quad 2 \times 14 \quad 820 =$$

$$2.2 \quad 2 \times 36 \quad 947 =$$

3. There is another technique that you can use to calculate the product. You can **double** and **halve**! This makes it easier to multiply with the “big” numbers. Look carefully at the following:

$$126 \times 5 = 63 \times 10 \text{ (halve 126 ; double 5)} = 630$$

Can you find the following answers by **doubling and halving**?

| | | | | | | | |
|-----|----|----------|----|-----|---|----------|-----|
| 3.1 | 50 | \times | 24 | 3.2 | 5 | \times | 346 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Table 2.5

BRAIN-TEASER!

Can you fill in the missing numbers/factors WITHOUT using your calculator?

| | | | | | | | | | |
|-------|----------|-------|-----|-----|-------|----------|-------|-----|-----|
| 48 | \times | 12 | $=$ | 576 | 64 | \times | 10 | $=$ | 640 |
| ..... | \times | 24 | $=$ | 576 | 32 | \times | | $=$ | 640 |
| 12 | \times | | $=$ | 576 | ..... | \times | 40 | $=$ | 640 |
| 6 | \times | | $=$ | 576 | 8 | \times | | $=$ | 640 |
| | \times | | $=$ | 576 | | \times | | $=$ | 640 |

Table 2.6

Did you discover a pattern?

2.1.5.11 Activity 6:

2.1.5.12 To calculate by using selected computations [LO 1.9.2]

1. Now let us look at multiplication with **multiples of 10 and 100**. As we work through the examples, you will see that there are certain rules that you must follow in order to calculate the product. If you apply these rules, you will be able to calculate the answers without doing long computations on paper. Work with a friend and write down the product of the following:

$$1.1 \quad 10 \times 6 = \dots ; \quad 10 \times 60 = \dots ;$$

$$10 \times 600 = \dots \text{ and } 10 \times 6\,000 = \dots$$

$$1.2 \quad 10 \times 9 = \dots ; \quad 10 \times 90 = \dots ;$$

$$10 \times 900 = \dots \text{ and } 10 \times 9\,000 = \dots$$

$$1.3 \quad 10 \times 15 = \dots ; \quad 10 \times 150 = \dots ;$$

$$10 \times 1\,500 = \dots$$

$$1.4 \quad 10 \times 26 = \dots ; \quad 10 \times 260 = \dots ;$$

$$10 \times 2\,600 = \dots$$

Can you now write down a rule for multiplying any number by 10?

Does this “work” for $0,5 \times 10$?

2. Let us look at multiplication with **multiples of 100**. Work with the same friend and write down the product of:

$$2.1 \quad 100 \times 8 = \dots ; \quad 100 \times 80 = \dots ;$$

$$100 \times 800 = \dots$$

$$2.2 \quad 100 \times 13 = \dots ; \quad 100 \times 130 = \dots ;$$

$$100 \times 1\,300 = \dots$$

$$2.3 \quad 100 \times 27 = \dots ; \quad 100 \times 270 = \dots ;$$

$$100 \times 2\,700 = \dots$$

- Write a rule for multiplying any number by 100:

Does your rule “work” for $0,2 \times 100$?

2.1.5.13 Activity 7:

2.1.5.14 To recognise and use the characteristics of multiplication with whole numbers [LO 1.12.3]

1. In our previous module we looked at the associative and commutative characteristics of addition – do you remember this? There are similar characteristics of multiplication. Do you want to know how it works? Fill in the missing factors to balance the equations:

$$8 \times 6 = 6 \times \underline{\quad \quad}$$

$$23 \times \underline{\quad \quad} = 13 \times 23$$

$$124 \times 85 = \underline{\quad \quad} \times 124$$

2. Is the following true or false?

$$2.1 \quad 6 \times 3 \times 4 = 3 \times 4 \times 6 = 4 \times 6 \times 3 \dots$$

$$2.2 \quad (2 \times 4) \times 5 = (5 \times 4) \times 2 = 4 \times (2 \times 5) \dots$$

3. What do you realise from the above examples?

2.1.5.15 Activity 8:

2.1.5.16 To estimate and calculate by means of rounding off [LO 1.8.1]

1. To be able to estimate answers is an important skill. If you are good at estimating, it will be easier for you to realise that you may have made a mistake in your calculations. **Round off** the following numbers first and in this way you will be able to estimate what the product of each of the following will be:

| SUM | ESTIMATE | CALCULATOR | DIFFERENCE |
|---------------------|----------|------------|------------|
| E.g. 19×21 | 400 | 399 | 1 |
| a) 38×27 | | | |
| b) 99×146 | | | |
| c) 45×69 | | | |
| d) 998×78 | | | |
| e) 409×18 | | | |

Table 2.7

BRAIN-TEASERS!

a) Which two numbers, smaller than 10, have 3 factors each?

..... and

b) Colour in the correct block:

| | | | |
|--|------|--------|---------|
| The product of 2 uneven numbers is always an | EVEN | UNEVEN | number. |
|--|------|--------|---------|

Table 2.8

- c) Which two numbers have a product of 48 and a sum of 16?
..... and

2.1.5.17 Activity 9 :

- To be able to solve problems in context [LO 1.6.1]
- To be able to use a series of techniques to do calculations [LO 1.10]

Let's do some brainstorming now. Your teacher will give you the necessary paper.

1. Split up into groups of three and, as quickly as possible, make a list of all the means of transportation that exist in our country.

2. Which of the above-mentioned would you choose if you had to travel? Why?
3. Where is your favourite seat in:

- a) a car
- b) a school bus
- c) a boat
- d) an aeroplane

4. Now see whether you are able to solve the following problems:

Messrs Slobo, Mugathle and Sisula have each bought a brand new taxi with which to transport passengers. For their first trip their plans are the following:

| Owner | Amount per person | Number of passengers | km travelled |
|----------|-------------------|----------------------|--------------|
| Slobo | R15,80 | 13 | 76 |
| Mugathle | R14,60 | 14 | 84 |
| Sisula | R16,25 | 12 | 59 |

Table 2.9

- Who made the most money with the first trip?
- If the petrol cost R1,05 for every kilometre that was travelled, how much did Mr Mugathle's petrol account come to?
- If all the passengers in Mr Slobo's taxi were athletes and they had to run back, how far did they run altogether?
- Explain to the rest of the class how your group calculated the answers.
- Compare your methods. How do your methods differ?
- Check the answers, using a pocket calculator.

2.1.5.18 Activity 10:

- To determine the equivalence and validity of different representations [LO 2.6.3]
- To use strategies to check solutions [LO 1.11]

1. In Activity 1.9 you used your own techniques and strategies to solve the problems. In your feedback to the class you probably noticed that there are many ways in which numbers can be multiplied. Split up into groups of three. Read the following problem and then see whether you can understand all the different solutions.

Chairs must be arranged in rows in a hall. There must be 23 rows with 16 chairs in each row. How many chairs are needed?

1.1 I calculate 23×16 like this:

$$23 = 10 + 10 + 1 + 1 + 1$$

| | |
|----|-------------|
| 23 | $\times 16$ |
| 10 | 160 |
| 10 | 160 |
| 2 | 32 |
| 1 | 16 |
| 23 | 368 |

Table 2.10

1.2 I calculate 23×16 in this way:

$$23 = 20 + 3$$

$$16 = 10 + 6$$

$$\text{Thus: } (20 + 3) \times (10 + 6)$$

$$20 \times 10 = 200$$

$$20 \times 6 = 120$$

$$3 \times 10 = 30$$

$$3 \times 6 = \underline{18}$$

$$368$$

1.3 I divide 16 into its factors:

$$23 \times 16 = 23 \times 2 \times 8$$

$$= 23 \times 2 \times 2 \times 4$$

$$= 46 \times 2 \times 4$$

$$= 92 \times 4$$

$$= 368$$

1.4 I calculate it like this:

$$23 \times 16 = (23 \times 20) - (23 \times 4) \quad (\text{I took } 4 \times 23 \text{ too much, so I had to subtract it})$$

$$= (23 \times 10 \times 2) - (23 \times 4)$$

$$= 460 - 92$$

$$= 368$$

1.5 My method is shorter!

$$\begin{array}{r} 23 \\ \times 16 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ (6 \times 3) \\ \hline \end{array}$$

$$\begin{array}{r} 120 \\ (6 \times 20) \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ (10 \times 3) \\ \hline \end{array}$$

$$\begin{array}{r} 200 \\ (10 \times 20) \\ \hline \end{array}$$

$$\begin{array}{r} 368 \\ \hline \end{array}$$

1.6 My method is shorter still!

$$\begin{array}{r} 12 \\ 3 \\ \hline \end{array}$$

$$\begin{array}{r} \times 16 \\ \hline \end{array}$$

$$\begin{array}{r} 1\ 3\ 8 \\ 2\ 3\ 0 \\ \hline 3\ 6\ 8 \end{array}$$

1.7 Which method do YOU choose?

Why?

2.1.5.19 Activity 11:

2.1.5.20 To use a series of techniques to do calculations [LO 1.10.5]

1. It is better to use a technique that you understand perfectly when you have to do a calculation. Use any method and calculate the following:

| | |
|--------------------|--------------------|
| 1.1 58×29 | 1.2 76×54 |
|--------------------|--------------------|

Table 2.11

2. In the following activity we are going to see how certain factors form patterns when we multiply them by each other. We are also going to use the pocket calculator to help us with our calculations.

2.1 Using the pocket calculator, complete the following:

$$77 \times 13 = \dots$$

$$77 \times 26 = \dots$$

$$77 \times 39 = \dots$$

$$77 \times \dots = 4\ 004$$

$$77 \times \dots = 5\ 005$$

$$77 \times 78 = \dots$$

$$77 \times 91 = \dots$$

2.2 Predict the answer without using your calculator: $77 \times \dots = 8\ 008$

$$77 \times 117 = \dots$$

2.3 What is the pattern in the above example?

2.4 Calculate the following, first without using the pocket calculator, and then by using it.

$$1 \times 9 + 2 = \dots$$

$$12 \times 9 + 3 = \dots$$

$$123 \times 9 + 4 = \dots$$

$$\dots \times 9 + 5 = 11\ 111$$

$$12\ 345 \times 9 + \dots = 111\ 111$$

$$\dots \times 9 + \dots = \dots$$

$$\dots \times 9 + \dots = \dots$$

2.5 Predict now without your calculator:

$$12\ 345\ 678 \times 9 + 9 = .$$

$$123\ 456\ 789 \times 9 + 10 =$$

2.6 Can you explain to a friend the pattern in the above example?

2.1.5.21 Activity 12:

2.1.5.22 To be able to do mental arithmetic [LO 1.9.2]

Let us see whether you can improve on your previous mental arithmetic test. This exercise will serve as preparation for the activities to follow. Fill in the missing answers of the MARKED BOXES ONLY.

| X | 2 | 6 | 7 | 8 | 9 | 10 | 12 | 100 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 36 | | | | | | | | |
| 48 | | | | | | | | |
| 124 | | | | | | | | |

Table 2.12**2.1.5.23 Activity 13:****2.1.5.24 To be able to solve problems in context [LO 1.6.1]****2.1.5.25 To be able to use a series of techniques to do calculations [LO 1.10.5]**

By now you know how to multiply by smaller numbers. Now we are going to see whether you are also able to do calculations with bigger numbers. Split up into groups of 3 and ask your teacher to give you the paper you need. Then read the instructions very carefully.

Michaela and her friends visited the zoo and heard the following interesting facts: a hippopotamus eats 45 kg of fodder per day, while a large bull elephant needs 225 kg of fodder per day!

1. How many kilograms of fodder will 329 hippopotamuses eat per day?
2. How many kilograms of fodder must the zoo buy per day to feed 76 bull elephants?
3. If the entrance fee was R15 per person and 475 people visited the zoo that day, how much money was taken at the entrance gate?
4. Explain to the rest of the class how your group calculated the answers.
5. Compare your methods. How do the various methods differ from each other?
6. Use a pocket calculator to check the answers.

2.1.5.26 Activity 14:**2.1.5.27 To determine the equivalence and the validity of different representations [LO 2.6.1]****2.1.5.28 To use strategies to check solutions [LO 1.11]**

1. In the previous activity you probably noticed that there is more than one method to do multiplication. Split up into groups of 3 again. Look carefully at the solutions to the following problem and explain the methods to one another.

Mrs Cele sells clothes. There are 46 different pairs of jeans and 238 different shirts. How many combinations can she make up?

1.1 I calculate 46×238 in this way

$$238 \times 46 = (200 + 30 + 8) \times (40 + 6)$$

$$200 \times 40 = 8\ 000$$

$$30 \times 40 = 1\ 200$$

$$8 \times 40 = 320$$

$$200 \times 6 = 1\ 200$$

$$30 \times 6 = 180$$

$$\begin{array}{r} 8 \times 6 = \underline{48} \\ 10\ 948 \end{array}$$

1.2 I write it in this way:

$$\begin{array}{r} 238 \\ \times \underline{46} \\ 48 (8 \times 6) \\ 180 (30 \times 6) \\ 1\ 200 (200 \times 6) \\ 320 (40 \times 8) \\ 1\ 200 (40 \times 30) \\ \underline{8\ 000} (40 \times 200) \\ 10\ 948 \end{array}$$

1.3 My method looks like this:

$$\begin{array}{r} 2\ 4\ 3\ 8 \\ \times \underline{4\ 6} \\ 1\ 4\ 2\ 8 \\ \underline{9\ 5\ 2\ 0} \\ 1\ 0\ 9\ 4\ 8 \end{array}$$

2. Now use any method that you understand and with which you feel comfortable, and calculate the product of:

2.1 576×47

2.1 576×47

CHALLENGE!

Can you calculate the product of the following by using the method shown in 1.3?

1. 347×251

2. 526×438

ANOTHER BRAIN-TEASER

Study the following sum carefully: $24 \times 13 = 377$

One of the digits is incorrect. Can you find out which one it is?

What must it be?

2.1.5.29 Activity 15:

2.1.5.30 To solve problems in context [LO 1.6.1]

Let's go out to dinner.

This assignment is for your portfolio. Your teacher will go through it with you and explain exactly what you are expected to do. Make sure that you understand perfectly before you start. Remember to work neatly.

Read the following menu carefully:

| Eat Well Restaurant | |
|---|--|
| ~~~~~ | |
| Soup | |
| Tomato Soup..... R 11,50 Chicken Soup..... R 12,95 Vegetable Soup..... R 13,50 | |
| Starters | |
| Yellowtail..... R 16,99 Kabeljou..... R 17,45 Snoek..... R 17,99 | |
| Main Course (served with salad and vegetables) | |
| Curry and Rice..... R 32,50 Tomato Stew..... R 32,50 Waterblommetjie Stew..... R 34,99 Chicken Pie..... R25,00 | |
| Desert | |
| Ice cream and Sauce..... R 9,99 Fruit Salad and ice cream..... R 13,50 Waffle with ice cream / cream..... R 11,99 | |
| ~~~~~ | |

Figure 2.2

Form groups of three. Your group decides to eat something from each section of the menu. To make it easier for the waiter, each person in your group chooses the same soup, starter, main course and dessert.

Decide what you are going to order and then calculate your account. Use the block below. You may use a calculator. First estimate what the meal will cost the group.

Please work in the given blocks in order to answer the following questions:

If each of you has R85, will your group have enough money to pay the bill?

If this is so, how much change will your group receive?

How much will you tip the waiter? Why?

Let us do a bit of research.

At which restaurant do you like eating the most?

Why?

According to you, what is a 'MUST' for a restaurant to be successful?

Can you think of any 'MUST NOT'S'?

Visit any two restaurants of your choice and compare their menus and prices. Write down what you will report back to the class.

2.1.6 Assessment

| |
|---|
| Learning outcomes(LOs) |
| |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. |
| <i>continued on next page</i> |

| |
|---|
| Assessment standards(ASs) |
| We know this when the learner: |
| 1.2 describes and illustrates various ways of writing numbers in different cultures (including local) throughout history; |
| 1.3 recognises and represents numbers in order to describe and compare them; |
| 1.3.6 multiples of single-digit numbers to at least 100; |
| 1.3.7 factors of at least any 2-digit whole number; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues; |
| 1.6.1 financial (including buying and selling, profit and loss, and simple budgets); |
| 1.8 estimates and calculates by selecting and using operations appropriate to solving problems: |
| 1.8.1 rounding off to the nearest 5, 10, 100 or 1 000; |
| 1.8.4 multiplication of at least whole 3-digit by 2-digit numbers; |
| 1.8.5 division of at least whole 3-digit by 2-digit numbers; |
| 1.9 performs mental calculations: |
| 1.9.2 multiplication of whole numbers to at least 10×10 ; |
| 1.10 uses a range of techniques to perform written and mental calculations with whole numbers: |
| 1.10.1 adding and subtracting in columns; |
| 1.10.4 doubling and halving; |
| 1.10.5 using a calculator; |
| 1.11 uses a range of strategies to check solutions and judge the reasonableness of solutions; |
| 1.12 recognises, describes and uses: 1.12.1 the reciprocal relationship between multiplication and division (e.g. if $5 \times 3 = 15$ then $15 \div 3 = 5$ and $15 \div 5 = 3$); 1.12.3 The commutative, associative and distributive properties with whole numbers (the expectation is that learners should be able to use the properties and not necessarily know the names). |
| LU 2 |
| Patterns, functions and algebra The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills. |
| We know this when the learner: |
| <i>continued on next page</i> |

| |
|--|
| 2.2 describes observed relationships or rules in own words; |
| 2.6 determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule presented: |
| • verbally; |
| 2.6.3 by number sentences. |

Table 2.13**2.1.7 Memorandum****ACTIVITY 2**1. (a) 24×1 (b) 36×1 1. $x 2$ 18×2 6×4 9×4 3×8 6×6 1. $x 3$

2.

| | | | | |
|-------|--------|-------|--------|----------------|
| 7 x 6 | 9 x 5 | 7 x 9 | 9 x 6 | 8 x 8; 32 x 2 |
| 9 x 8 | 12 x 9 | 6 x 8 | 8 x 11 | 12 x 8; 32 x 3 |

Table 2.14**ACTIVITY 3**

| | | | | | | | |
|----|----|----|----|----|-----|-----|--|
| | | | | | | | |
| 20 | 25 | 30 | 35 | 40 | 45 | 60 | |
| 24 | 30 | 36 | 42 | 48 | 54 | 72 | |
| 28 | 35 | 42 | 49 | 56 | 63 | 84 | |
| 32 | 40 | 48 | 56 | 64 | 72 | 96 | |
| 36 | 45 | 54 | 63 | 72 | 81 | 108 | |
| 48 | 60 | 72 | 84 | 96 | 108 | 144 | |

Table 2.15**BRAIN TEASERS**9. $1 \times 241 : 241$ (1×241)Double 241 : 482 (2×241)Double 482 : 964 (4×241)Double 964 : 1 928 (8×241)

615

ACTIVITY 51.1 $(1\ 000 + 1\ 000) + (400 + 400) + (30 + 30)$

$$\begin{aligned}
 & 2\ 000 + 800 + 60 \\
 & = 2\ 860 \\
 & 1.2 (2\ 000 + 2\ 000) + (300 + 300) + (10 + 10) + (5 + 5) \\
 & 4\ 000 + 600 + 20 + 10 \\
 & = 4\ 630 \\
 & 2.1 (14\ 000 + 14\ 000) + (800 + 800) + (20 + 20) \\
 & 28\ 000 + 1\ 600 + 40 \\
 & = 29\ 640 \\
 & 2.2 (36\ 000 + 36\ 000) + (900 + 900) + (47 + 47) \\
 & 72\ 000 + 1\ 800 + 94 \\
 & = 73\ 894 \\
 & 3.1 = 100 \times 12 \quad 3.2 = 10 \times 173 \\
 & = 1\ 200 = 1\ 730 \\
 & \text{BRAIN TEASERS} \\
 & 24\ 20
 \end{aligned}$$

1. 16

96 80

$$\begin{aligned}
 & 3 \times 192 \quad 4 \times 160 \\
 & \text{Halve multiplicand} \\
 & \text{Double multiplier} \\
 & \text{ACTIVITY 6} \\
 & 1.1 \ 60; 600; 6\ 000; 60\ 000 \\
 & 1.2 \ 90; 900; 9\ 000; 90\ 000 \\
 & 1.3 \ 150; 1\ 500; 15\ 000 \\
 & 1.4 \ 260; 2\ 600; 26\ 000
 \end{aligned}$$

Add a naught only to multiplier.

$$\begin{aligned}
 & 2.1 \ 800; 8\ 000; 80\ 000 \\
 & 2.2 \ 1\ 300; 13\ 000; 130\ 000 \\
 & 2.3 \ 2\ 700; 27\ 000; 270\ 000
 \end{aligned}$$

Add two noughts to multiplier.

ACTIVITY 7

1. $8 \times 6\ 6 \times 8\ 23 \times 13\ 13 \times 23\ 124 \times 85\ 85 \times 124$
2. (a) true

(a) true

3. It does not matter in which order you multiply.

ACTIVITY 8

1. (a) 1 026
 - (a) 14 454
 - (b) 3 105
 - (c) 77 844
 - (d) 7 362

BRAIN TEASERS

(a) 4 9

- (a) uneven
- (b) 12 4

own answer

own answer

ACTIVITY 11

1.1 1 628

1.2 4 104

2.1 1 001

2 002

3 003

52

65

6 006

7 007

2.2 104

9 009

2.3 Multiplier becomes 13 times more each time.

2.4 11

111

1 111

1 234

6

123 456 7 1 111 111

1 234 567 8 11 111 111

2.5 111 111 111

1 111 111 111

ACTIVITY 12

| x | 2 | 6 | 7 | 8 | 9 | 10 | 12 | 100 |
|-----|-----|----|----|----|----|-------|-----|--------|
| 5 | | 30 | | | 45 | | | |
| 6 | | | | 48 | | | 72 | |
| 7 | | 42 | | | 63 | | 84 | |
| 8 | | | 56 | | | | 96 | |
| 9 | | | | 72 | | | 108 | |
| 36 | 72 | | | | | 360 | | 3 600 |
| 48 | 96 | | | | | 480 | | 4 800 |
| 124 | 248 | | | | | 1 240 | | 12 400 |

Table 2.16

ACTIVITY 14

2.1 27 072

2.2 26 358

1. 347

x 251

347

17 350

69 400

$$\begin{array}{r}
 87\ 097 \\
 \times 2.\ 526 \\
 \hline
 4\ 208 \\
 15\ 780 \\
 210\ 400 \\
 \hline
 230\ 388
 \end{array}$$

2.1.7.1 ANOTHER BRAIN-TEASER

$$\begin{array}{r}
 4 \\
 \times 9 \\
 \hline
 \end{array}$$

2.2 Division²

2.2.1 MATHEMATICS

2.2.2 Grade 5

2.2.3 MULTIPLICATION AND DIVISION

2.2.4 Module 33

2.2.5 DIVISION

2.2.5.1 Activity 1:

2.2.5.2 To be able to do mental arithmetic [LO 1.10]

1. You already know how important it is to be able to do mental arithmetic. You also know how important it is to know your tables. Doing mental arithmetic and knowing your tables will help you do division correctly, too. Let us start right away! Do you also like dried sausage ("droëwors")? Work with a friend. Look closely at the two "sausage machines". The one who is first to give the answers is the fastest sausage maker!

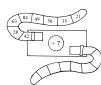
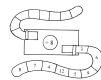


Figure 2.3

²This content is available online at <<http://cnx.org/content/m30816/1.1/>>.

**Figure 2.4**

Who won?

2. Work on your own and colour in according to the code: 4 = dark grey ; 5 = pink ; 6 = light grey ; 7 = black ; 9 = red.
3. Complete the tables:

| | | | | | | | | |
|-----|------------|----|-------|-------|-------|-------|-------|-------|
| | | 34 | | | | | | |
| 3.1 | Divided by | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | Remainders | 1 | ..... | ..... | ..... | ..... | ..... | ..... |

Table 2.17

| | | | | | | | | |
|-----|------------|----|-------|-------|-------|-------|-------|-------|
| | | 61 | | | | | | |
| 3.2 | Divided by | 2 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Remainders | 1 | ..... | ..... | ..... | ..... | ..... | ..... |

Table 2.18

4. Let us see how well you do in the following mental test. Complete it as quickly and accurately as you can:

| | |
|------------------------------|-----------------------------------|
| | |
| 4.1 $35 - 5 - 5 - 5 = \dots$ | 4.11 $108 - 12 - 12 - 12 = \dots$ |
| 4.2 $64 - 8 - 8 = \dots$ | 4.12 $72 - 9 - 9 = \dots$ |
| 4.3 $42 \div 7 = \dots$ | 4.13 Halve: 612: \dots |
| 4.4 $54 \div 6 = \dots$ | 4.14 Halve: 487: \dots |
| 4.5 $\dots \div 7 = 8$ | 4.15 Halve: 1 036: \dots |
| 4.6 $\dots \div 12 = 6$ | 4.16 $\dots \div 9 = 4$ |
| 4.7 $28 \div 4 = \dots$ | 4.17 $\dots \div 8 = 6$ |
| 4.8 $280 \div 4 = \dots$ | 4.18 $60 \div \dots = 5$ |
| 4.9 $280 \div 40 = \dots$ | 4.19 $36 \div \dots = 4$ |
| 4.10 $2 800 \div 40 = \dots$ | 4.20 $3 600 \div 90 = \dots$ |

Table 2.19

DID YOU KNOW?

Division is the **inverse** of multiplication.

Thus: $5 \times 3 = 15$ $15 \div 3 = 5$ en $15 \div 5 = 3$

When I want to check a division sum, I multiply. When I check a multiplication sum, I divide

2.2.5.3 Activity 2:**2.2.5.4 To recognise, describe and use the reciprocal relation between multiplication and division****2.2.5.5 [LO 1.12.1]**

1. Now use your knowledge of the "inverse" to complete the following:
 - 1.1 If $26 \times 17 = 442$, then $442 \div 17 = \dots$ and $442 \div \dots = 17$
 - If $24 \times 30 = 720$, then $720 \div \dots = 24$ and $720 \div 24 = \dots$

DID YOU ALSO KNOW?

When we divide, we do the following:

REPEATED SUBTRACTION

$$12 \div 3 = 12 - 3 - 3 - 3 - 3 = 4$$

GROUPING

$12 \div 3$: We must divide 12 into 3 equal groups

DIVISION

$12 \div 3$: We must divide 12 equally between 3

123

2.2.5.6 Activity 3:**2.2.5.7 To recognise and represent numbers and to describe and compare them [LO 1.3]**

1. Let us do revision. Do you remember what happens when we divide any number by 1? Work with a friend and find the answers to the following:

$$1.1 5 \div 1 = \dots \quad 1.2 86 \div 1 = \dots$$

$$1.3 359 \div 1 = \dots \quad 1.4 4\,625 \div 1 = \dots$$

$$1.5 32\,174 \div 1 = \dots$$

2. Write down a rule for dividing by 1.

BRAIN-TEASER!

If $5 \div 1 = 5$ and $86 \div 1 = 86$, then:

$$1 \div 5 = \dots$$

$$1 \div 86 = \dots$$

$$1 \div 359 = \dots$$

$$1 \div 4\,625 = \dots$$

Thus, if 1 is the dividend, then the answer is always a.....

3. Now let us see what happens when we divide any number by 0. Work with a friend once more and do the following with the aid of your calculator:

$$3.1 6 \div 0 = \dots \quad 3.2 38 \div 0 = \dots$$

$$3.3 438 \div 0 = \dots \quad 3.4 1\,679 \div 0 = \dots$$

- $63\,827 \div 0 = \dots$

4. Why does the calculator give these answers?

DO YOU STILL REMEMBER?

Division by 0 is not allowed. We say it is **undefined**.

BRAIN-TEASER!

I think of a number. If I subtract 3 and then divide the number by 6, the quotient will be 7. What is the number?

I think of another number. If I halve it and then divide it by 12, the quotient will be 9. What is the number?

2.2.5.8 Activity 4:**2.2.5.9 To describe and illustrate other cultures' ways of writing [LO 1.2]****DID YOU KNOW?**

The Chinese write either from top to bottom or from left to right. Some of their numbers look like these:

1.

—

Figure 2.5

2.

≡

Figure 2.6

3.

☰

Figure 2.7

4.

一一

Figure 2.8

5.

五

Figure 2.9

6.

六

Figure 2.10

7.

七

Figure 2.11

8.

八

Figure 2.12

9.

九

Figure 2.13

10.

+

Figure 2.14

百

Figure 2.15

100.

1.1 Can you write the following in Chinese? Then give the answer in our number system.

| | | |
|----|-----------------|--|
| a) | $10 \div 1 =$ | |
| b) | $100 \div 10 =$ | |
| c) | $9 \div 3 =$ | |
| d) | $100 \div 4 =$ | |
| e) | $100 \div 5 =$ | |
| f) | $100 \div 7 =$ | |

Table 2.20

Division by 10, 100 and 1 000

2.2.5.10 Activity 5:

2.2.5.11 To describe observed patterns and rules in own terms [LO 2.2]

1. In Mathematics certain rules enable us to calculate answers quickly. However, we must be able to "spot" or "deduce" the rule first before we can apply it. Work with a friend and complete the table.

| | | | | | | | | | |
|-----------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| Number | 20 | 50 | 90 | 120 | 360 | 1 470 | 2 560 | 14 380 | 26 520 |
| $\div 10$ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

Table 2.21

What do you notice when you look at the answer?

2. Complete the following also:

| | | | | | | |
|------------|-------|-------|-------|-------|--------|--------|
| Number | 300 | 800 | 1 200 | 2 600 | 14 700 | 32 500 |
| $\div 100$ | ..... | ..... | ..... | ..... | ..... | ..... |

Table 2.22

- Can you also write down the answers to the following?
 3. Can you also write down the answers to the following?

| | | | | | | |
|---------------|-------|-------|--------|--------|---------|---------|
| Number | 5 000 | 7 000 | 13 000 | 45 000 | 126 000 | 382 000 |
| $\div 1\ 000$ | ..... | ..... | ..... | ..... | ..... | ..... |

Table 2.23

What happens when we divide by 1 000?

Division by multiples of 10 and 100:

2.2.5.12 Activity 6:

2.2.5.13 To calculate by using selected computations [LO 1.8.4]

1. You have now discovered rules for division by 10, 100 and 1 000. Now let us look at division by multiples of 10 and 100. Work through the following calculations with a friend:

| | |
|--|--|
| 1.1 $180 \div 20 = (180 \div 10) \div 2 = 18 \div 2 = 9$ | 1.2 $4\ 200 \div 60 = (4\ 200 \div 10) \div 6 = 420 \div 6 = 70$ |
| 1.3 $3\ 600 \div 400 = (3\ 600 \div 100) \div 4 = 36 \div 4 = 9$ | 1.4 $54\ 000 \div 900 = (54\ 000 \div 100) \div 9 = 540 \div 9 = 60$ |

Table 2.24

2. Complete the following on your own:

2.1 $1\ 380 \div 60 = (1\ 380 \div 10) \div \dots$

= \div

=

2.2 $32\ 840 \div 40 = (32\ 840 \div \dots) \div \dots$

= \div

=

2.3 $15\ 500 \div 500 = (15\ 500 \div 100) \div \dots$

= \div

=

2.4 $312\ 300 \div 300 = (312\ 300 \div \dots) \div \dots$

= \div

=

DID YOU KNOW?

We can also break up the **divisor** into **factors**:

E.g. $108 \div 12 = 108 \div 4 \div 3 = 27 \div 3 = 9$

OR

$108 \div 12 = 108 \div 2 \div 6 = 54 \div 6 = 9$

3. Calculate the following by breaking up the **divisor** into **factors**:

3.1 $105 \div 21 = \dots \quad 3.2 \quad 216 \div 24 = \dots$

= =

= =

3.3 $432 \div 24 = \dots \quad 3.4 \quad 126 \div 14 = \dots$

= =

= =

4. Work together with a friend. Look carefully at the following and then explain it to two other friends.

$$4.1 \quad 184 \div 4 = (180 + 4) \div 4$$

$$= (180 \div 4) + (4 \div 4)$$

$$= 45 + 1$$

$$= 46$$

$$4.2 \quad 2\ 515 \div 5 = (2\ 000 + 500 + 15) \div 5$$

$$= (2\ 000 \div 5) + (500 \div 5) + (15 \div 5)$$

$$= 400 + 100 + 3$$

$$= 503$$

$$4.3 \quad 3\ 672 \div 12 = (3\ 600 \div 12) + (72 \div 12)$$

$$= 300 + 6$$

$$= 306$$

5. Complete the following:

$$5.1 \quad 3\ 045 \div 15 = (3\ 000 + \dots) \div 15$$

$$= (\dots \div 15) + (\dots \div 15)$$

$$= 200 + \dots$$

$$= \dots$$

$$5.2 \quad 2\ 575 \div 25 = (2\ 000 + \dots + \dots) \div 25$$

$$= (2\ 000 \div 25) + (\dots \div \dots) + (\dots \div \dots)$$

$$= \dots + \dots + \dots$$

$$= \dots$$

5.3 Can you write down your own explanation?

2.2.5.14 Activity 7:

2.2.5.15 To be able to do mental arithmetic [LO 1.9.2]

1. Let us test your mental skills again. Find the correct answer and encircle it with your pencil. Find out who or what is hidden away.

$$1.1 \quad 96 \div 12$$

$$1.2 \quad 108 \div 9$$

$$1.3 \quad 72 \div 9$$

$$1.4 \quad 42 \div 6$$

$$1.5 \quad 54 \div 6$$

$$1.6 \quad 32 \div 8$$

$$1.7 \quad 27 \div 9$$

$$1.8 \quad 66 \div 11$$

$$1.9 \quad 81 \div 9$$

$$1.10 \quad 35 \div 7$$

$$1.11 \quad 21 \div 3$$

$$1.12 \quad \underline{\quad} \div 6 = 9$$

$$1.13 \quad \underline{\quad} \div 8 = 6$$

$$1.14 \quad \underline{\quad} \div 6 = 12$$

$$1.15 \quad \underline{\quad} \div 11 = 12$$

$$1.16 \quad \underline{\quad} \div 9 = 5$$

$$1.17 \quad \underline{\quad} \div 7 = 8$$

$$1.18 \text{ Halve: } 96$$

$$1.19 \text{ Halve: } 134$$

$$1.20 \text{ Halve: } 576$$

Colour the pictures in neatly so that your answers are clearly visible.

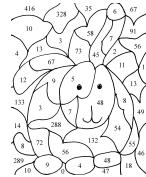


Figure 2.16

2.2.5.16 Activity 8:**2.2.5.17 To estimate and calculate by using selected computations [LO 1.8.5]**

1. We have already discussed the value of **estimation**. Let us see again how well you can estimate. Encircle the best answer.

| | | I ESTIMATE | | |
|----|-----------------------------------|------------|-----|-----|
| a) | How many 16's are there in 35? | 2 | 12 | 20 |
| b) | How many 15's are there in 93? | 6 | 16 | 60 |
| c) | How many 13's are there in 271? | 2 | 20 | 200 |
| d) | How many 25's are there in 4 130? | 27 | 175 | 750 |
| e) | How many 21's are there in 8 565? | 4 | 40 | 400 |

Table 2.25

2. Now use your calculator to see whether you were spot on.

2.2.5.18 Activity 9:**2.2.5.19 To be able to solve problems in context [LO 1.6.1]**

- The following activity is a group project that you can add to your portfolio. Your educator will provide you with the necessary paper and will explain exactly what you are expected to do.
- Divide into groups of four or five and then read the assignment closely.
- Your group must visit at least three florists or flower vendors in your area. Your job is to determine which florist or vendor is the cheapest.

Remember to use the following as guidelines:

- Look only at **mixed bouquets**.
- Consider the **number of flowers** in every bunch.
- State in your report which of the vendors or florists is the cheapest and motivate your answer. Remember to show all your calculations.
- Work neatly and hand in your project on time.

2.2.5.20 Activity 10:

2.2.5.21 To solve problems in context [LO 1.6]

1. Divide into groups of three. Ask your educator for the necessary paper and solve the following problems without the use of a calculator:

- 2 924 spectators have to be transported by bus to a soccer stadium. If every bus can seat 68 passengers, how many buses are needed to take everybody to the stadium?
 - 55 educators were taken by taxi to the same stadium. If they had to pay R2 475 in total for the trip, how much money did each educator have to pay the driver?
 - A group of rugby players decided to support their soccer-playing friends. If there were 2 010 rugby players in total, how many rugby teams attended the soccer matches? (There are 15 players in a rugby team).
2. Check your answers with a calculator.
3. Compare your solutions to those of the other groups in class.
 4. Discuss the differences and / or similarities between the different methods used.

2.2.5.22 Activity 11:

2.2.5.23 To determine the equivalence and validity of different representations of the same problem by means of comparison and discussion [LO 2.6]

- In the previous activity you used your own strategies and methods to solve the problems. In the next activity the answers have already been calculated. Work with a friend and explain to each other the different solutions to the problem:

There are 7 310 books in the school library. The librarian wants to put 34 books on each shelf. How many shelves does she need?

1. I calculate my answer by doing **repeated subtraction**.

I know $34 \times 100 = 3\ 400$.

Thus: 7 310

$\underline{- 3\ 400 \ (100)}$

3 910

$\underline{- 3\ 400 \ (100)}$

510

$\underline{- 340 \ (10)}$

170

$\underline{- 170 \ (5)}$

The answer is thus $100 + 100 + 10 + 5 = 215$

2. I must calculate $7\ 310 \div 34$. I do this by **multiplication**.

$34 \times 100 = 3\ 400$, so $34 \times 200 = 6\ 800$

$7\ 310 - 6\ 800 = 510$

$34 \times 10 = 340$

$510 - 340 = 170$

$34 \times 5 = 170$

$170 - 170 = 0$

The quotient is thus $200 + 10 + 5 = 215$

$$1. 7\ 310 = 3\ 400 + 3\ 400 + 340 + 170$$

Thus: $(3\ 400 \div 34) + (3\ 400 \div 34) + (340 \div 34) + (170 \div 34)$
 $= 100 + 100 + 10 + 5$
 $= 215$

6. Can you think of another method to calculate $7\ 310 \div 34$?

7 Explain the method used at no. 5 to your class. (Imagine YOU are the teacher!)

8. Which of the above methods do you prefer?

Why?

2.2.5.24 Activity 12:

2.2.5.25 To calculate by using selected computations [LO 1.8.5]

1. You have now looked at a variety of methods that we can use for division. Now let us concentrate on only one of them. Find the quotient of the following by using the method as applied to no. 5 on the previous page.

| | |
|----------------------|----------------------|
| 1.1 $4\ 650 \div 25$ | 1.2 $5\ 250 \div 21$ |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Table 2.26

| | |
|----------------------|----------------------|
| 1.3 $2\ 648 \div 42$ | 1.4 $9\ 850 \div 50$ |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Table 2.27

2. Now use any method of your choice and calculate:

| | |
|-----------------------|-----------------------|
| 2.1 $15\ 350 \div 45$ | 2.2 $32\ 648 \div 28$ |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Table 2.28

2.2.6 Assessment

| |
|---|
| Learning outcomes(LOs) |
| |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. |
| Assessment standards(ASs) |
| |
| We know this when the learner: |
| 1.2 describes and illustrates various ways of writing numbers in different cultures (including local) throughout history; |
| 1.3 recognises and represents numbers in order to describe and compare them: |
| 1.3.6 multiples of single-digit numbers to at least 100; |
| 1.3.7 factors of at least any 2-digit whole number; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues; |
| 1.6.1 financial (including buying and selling, profit and loss, and simple budgets); |
| <i>continued on next page</i> |

| |
|---|
| 1.8 estimates and calculates by selecting and using operations appropriate to solving problems: |
| 1.8.1 rounding off to the nearest 5, 10, 100 or 1 000; |
| 1.8.4 multiplication of at least whole 3-digit by 2-digit numbers; |
| 1.8.5 division of at least whole 3-digit by 2-digit numbers; |
| 1.9 performs mental calculations: |
| 1.9.2 multiplication of whole numbers to at least 10×10 ; |
| 1.10 uses a range of techniques to perform written and mental calculations with whole numbers: |
| 1.10.1 adding and subtracting in columns; |
| 1.10.4 doubling and halving; |
| 1.10.5 using a calculator; |
| 1.11 uses a range of strategies to check solutions and judge the reasonableness of solutions; |
| 1.12 recognises, describes and uses: 1.12.1 the reciprocal relationship between multiplication and division (e.g. if $5 \times 3 = 15$ then $15 \div 3 = 5$ and $15 \div 5 = 3$); 1.12.3 The commutative, associative and distributive properties with whole numbers (the expectation is that learners should be able to use the properties and not necessarily know the names). |
| LU 2 |
| Patterns, functions and algebra The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills. |
| We know this when the learner: |
| 2.2 describes observed relationships or rules in own words; |
| 2.6 determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule presented: |
| • verbally; |
| 2.6.3 by number sentences. |

Table 2.29

2.2.7 Memorandum

ACTIVITY 1

3.1

| | | | | | | | |
|--|----|---|---|---|---|---|---|
| | 34 | | | | | | |
| | | | | | | | |
| | | 2 | 4 | 4 | 6 | 2 | 7 |

Table 2.30

3.2

| | | | | | | | |
|-----|----|---|---|---|---|---|---|
| | 61 | | | | | | |
| | | | | | | | |
| Res | | 1 | 1 | 5 | 5 | 6 | 1 |

Table 2.31

4. 4.1 20 4.11 72
 4.2 48 4.12 54
 4.3 6 4.13 306
 4.4 9 4.14 243 $\frac{1}{2}$
 4.5 56 4.15 518
 4.6 72 4.16 36
 4.7 7 4.17 48
 4.8 70 4.18 12
 4.8 7 4.19 9
 4.10 70 4.20 40
 ACTIVITY 2
 1.1 26 26
 1.2 30 30
 ACTIVITY 3
 1.1 5
 1.2 86
 1.3 359
 1.4 4 625
 1.5 32 174
 2. When any number is divided by 1, the answer always remains the number
 BRAIN TEASERS

$$\frac{1}{5} \quad (2.1)$$

$\frac{1}{86}$

$$\frac{1}{359} \quad (2.2)$$

$$\frac{1}{4625} \quad (2.3)$$

Fractions

3. 3.1 O E 3.2 O E
 3.3 O E 3.4 O E
 3.5 O E
 4. Shows “Error” (Answer is incorrect)

BRAIN TEASERS

45

216

ACTIVITY 4

1.1 a) 10

- a) 10
- b) 3
- c) 25
- d) 20
- e) 14 rem 2

14 $\frac{2}{7}$
 ACTIVITY 5
 1.

| | | | | | | | | |
|--|---|---|---|----|-----|-----|-------|-------|
| | | | | | | | | |
| | 2 | 5 | 9 | 12 | 147 | 256 | 1 438 | 2 652 |

Table 2.32

O falls away. Each number moves one place to the right.
2.

| | | | | | | | |
|--|---|---|----|----|-----|-----|--|
| | | | | | | | |
| | 3 | 8 | 12 | 26 | 147 | 325 | |

Table 2.33

2 Noughts fall away. Each number moves two places to the right.
3.

| | | | | | | | |
|--|---|---|----|----|-----|-----|--|
| | | | | | | | |
| | 5 | 7 | 13 | 45 | 126 | 382 | |

Table 2.34

3 Noughts falls away. Each number moves three places to the right.

$$2. \quad 2.1 = (1\ 380\ 110)\ 6$$

$$= 138\ 6$$

$$= 23$$

$$2.2 = (32\ 840\ 10)\ 4$$

$$= 3\ 284\ 4$$

$$= 821$$

$$2.3 = (15\ 500\ 100)\ 5$$

$$= 155\ 5$$

$$= 31$$

$$2.4 = (312\ 300\ 100)\ 3$$

$$= 3\ 123$$

$$= 1\ 041$$

$$3. \quad 3.1 = 105\ 3\ 7\ 3.2 = 216\ 4\ 6$$

$$= 35\ 7 = 54\ 6$$

$$= 5 = 9$$

$$3.3 = 432\ 8\ 3\ 3.4 = 126\ 2\ 7$$

$$= 54\ 3 = 63\ 7$$

$$= 18 = 9$$

$$5. \quad 5.1 = (3\ 000 + 45)\ 15$$

$$= (\mathbf{3\ 000}\ 15) + (\mathbf{45}\ 15)$$

$$= 200 + \mathbf{3}$$

$$= \mathbf{203}$$

$$5.2 = (2\ 000 + \mathbf{500} + \mathbf{75})\ 25$$

$$= (2\ 000\ 25) + (\mathbf{500}\ \mathbf{25}) + (\mathbf{75}\ 25)$$

$$= \mathbf{80} + \mathbf{20} + \mathbf{3}$$

$$= \mathbf{103}$$

ACTIVITY 8

1.

| | | |
|------|-----|-----|
| a) 2 | | |
| b) 6 | | |
| c) | 20 | |
| d) | 175 | |
| e) | | 400 |

Table 2.35

ACTIVITY 12

$$\begin{array}{r}
 186 \ 250 \\
 -25 \quad -42 \\
 \hline
 215 \ 105 \\
 -200 \quad -105 \\
 \hline
 150 \ 0 \\
 -150 \quad -0 \\
 \hline
 \dots \ .
 \end{array}$$

$$\begin{array}{r}
 1.3 \ 63 \ 1.4 \\
 197
 \end{array}$$

$$50 \mid \overline{9850}$$

(2.4)

$$\begin{array}{r}
 -50485 \quad -450350 \quad -350 \dots 42 \mid \overline{2648} \\
 -252 \\
 \hline
 128 \\
 -126 \\
 \hline
 2 \\
 63 \text{ rem } 2 \\
 2.1 \ 341 \text{ rem } 5 \ 2.2 \ 1 \ 166
 \end{array}$$

Chapter 3

Term 3

3.1 To recognise, classify and represent fractions (positive numbers)¹

3.1.1 MATHEMATICS

3.1.2 Grade 5

3.1.3 ORDINARY AND DECIMAL FRACTIONS

3.1.4 Module 45

3.1.5 TO RECOGNISE, CLASSIFY AND REPRESENT FRACTIONS (POSITIVE NUMBERS)

3.1.5.1 Activity 1:

3.1.5.2 To recognise, classify and represent fractions (positive numbers) in order to describe and compare them [LO 1.3.2]

1. How much do you still remember of what you learnt about fractions in Gr. 4? Let us start with a competition – girls against boys! Take turns and see if you can answer the following questions. Your educator will tell you who must answer first and will also award points (2 points for every correct answer and 5 points if the boys can answer a question that the girls can't, and vice versa).

- 1.1 What is a fraction?
 - 1.2 If I write $\frac{2}{5}$ what do I call the 2?
 - 1.3 What operation sign can replace the — in $\frac{2}{5}$?
 - 1.4 What is the function of the denominator?
 - 1.5 If I cut up a whole into more and more sections, each section becomes _____
 - 1.6 What do I call the 7 in $\frac{4}{7}$?
 - 1.7 Fractions of the same size are called _____ fractions.
 - 1.8 The fewer the number of sections the whole is divided into, the _____ they are.
 - 1.9 What is the function of the numerator?
 - 1.10 How do we simplify our fractions?
- LET US REVISE
- A fraction is an **equal** part of a whole.

¹This content is available online at <<http://cnx.org/content/m30933/1.1/>>.

**Figure 3.1****Four-fifths**

- 4: Counts how many equal parts I am working with and is called the numerator.
 5: The denominator says how many equal parts the whole has been divided into.
 2. Let us test your knowledge by means of a few practical activities. Look at the following and answer the questions:

2.1 Colour in the figures that show halves:

- (a) (b) (c) (d)

2.2 Colour in only the figures that show quarters:

- (a) (b) (c)
 (d) (e)

2.3 Neatly colour in the figures that show sixths:

- (a) (b) (c) (d)

2.4 Why didn't you colour in the other figure *c*?

2.5 What fraction is cut out in each of the following figures?

- i) ii) iii) iv) v) vi)
 vii) viii) ix) x) xi)

3.1.5.3 Activity 2:

3.1.5.4 To recognise, classify and represent fractions (positive numbers) in order to describe and compare them [LO 1.3.2]

3.1.5.5 To use tables to sort and record data [LO 5.3]

1. In the next activity we are going to find out whether you can recognise and then record the fractions correctly. Look at the figures and then complete the table.

A.

**Figure 3.2**

B.



Figure 3.3

C.



Figure 3.4

D.



Figure 3.5

E.



Figure 3.6

F.



Figure 3.7

G.



Figure 3.8

H.



Figure 3.9

I.



Figure 3.10

J.



Figure 3.11

K.



Figure 3.12

| | Diagram | Number of equal parts | Number of parts coloured in | Fraction coloured in | Number of parts not coloured in | Fraction not coloured in |
|------|---------|-----------------------|-----------------------------|----------------------|---------------------------------|--------------------------|
| E.g. | A | 3 | 1 | $\frac{1}{3}$ | 2 | $\frac{2}{3}$ |
| | B | ..... | ..... | ..... | ..... | ..... |
| | C | ..... | ..... | ..... | ..... | ..... |
| | D | ..... | ..... | ..... | ..... | ..... |
| | E | ..... | ..... | ..... | ..... | ..... |
| | F | ..... | ..... | ..... | ..... | ..... |
| | G | ..... | ..... | ..... | ..... | ..... |
| | H | ..... | ..... | ..... | ..... | ..... |
| | I | ..... | ..... | ..... | ..... | ..... |
| | J | ..... | ..... | ..... | ..... | ..... |
| | K | ..... | ..... | ..... | ..... | ..... |

Table 3.1

Did you know?

| | |
|----------------|---|
| $\frac{2}{5}$ | is a proper fraction . The numerator is smaller than the denominator. |
| $\frac{9}{4}$ | is an improper fraction . The numerator is bigger than the denominator. |
| $1\frac{2}{3}$ | is a mixed number . A mixed number is always bigger than 1 and consists of a whole number (1) plus a fraction ($\frac{2}{3}$). |

Table 3.2

3.1.5.6 Activity 3:

3.1.5.7 To calculate by means of computations that are suitable to be used in adding ordinary fractions [LO 1.8.3]

1. Can you still remember how to add fractions? Let us see. Work together with a friend. Take turns to say the answers. Choose any two fractions and add them. Give your answer first as an improper fraction and then as a mixed number.

Ask your teacher's help if you struggle.

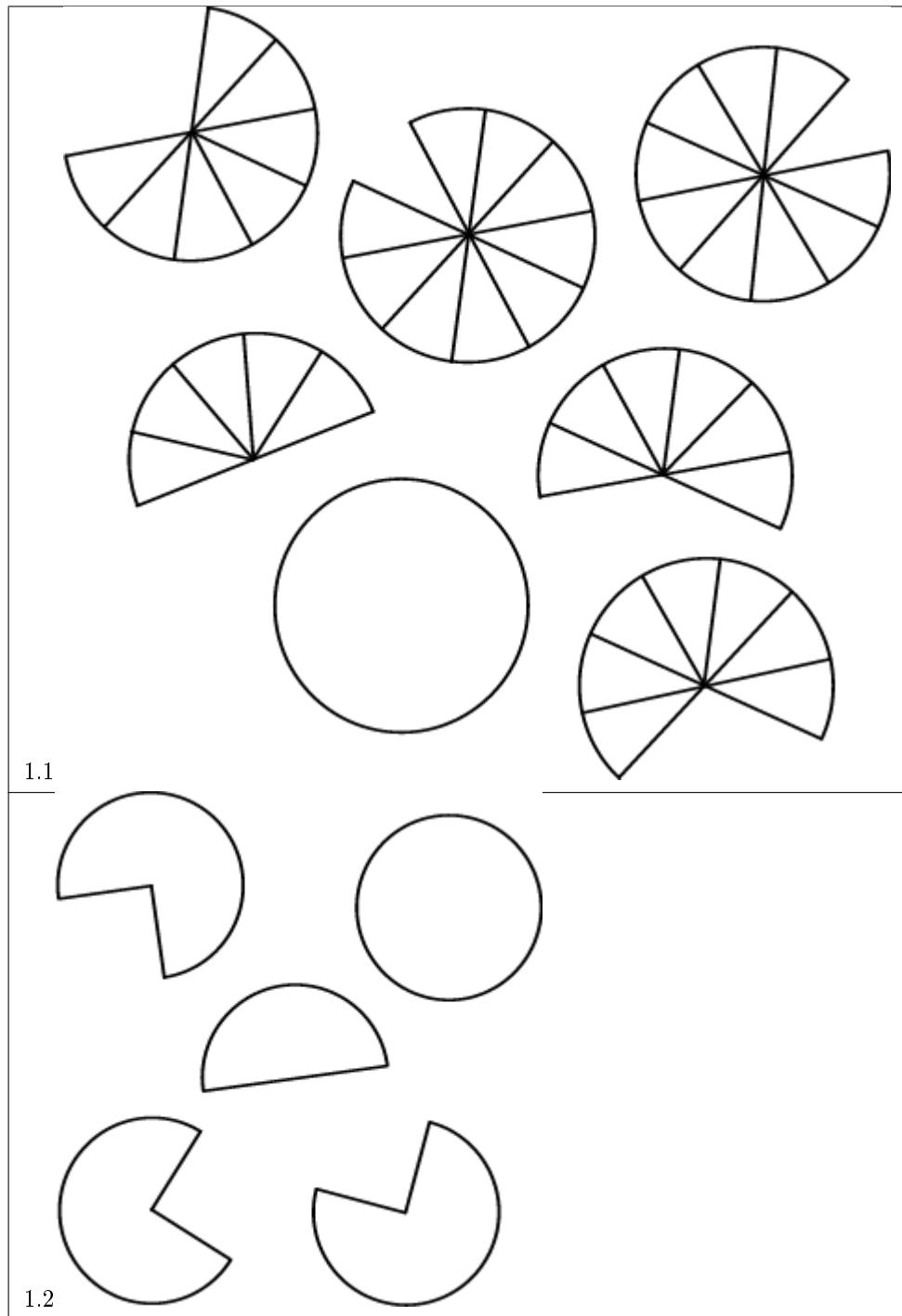


Table 3.3

3.1.5.8 Activity 4:**3.1.5.9 To recognise and use equivalent forms [LO 1.5.1]**

1. Look carefully at the following questions and then complete them as neatly as possible.

EQUIVALENT FRACTIONS

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| 1.1 Colour $\frac{1}{2}$ of the figure in blue: | | | | | | | | |
| | | | | | | | | |
| 1.2 Colour $\frac{2}{4}$ of the figure in green: | | | | | | | | |
| | | | | | | | | |
| 1.3 Colour $\frac{4}{8}$ of the figure in yellow: | | | | | | | | |
| | | | | | | | | |
| 1.4 Colour $\frac{8}{16}$ of the figure in red: | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Table 3.4

- What do you notice?

| | | | | | | | |
|---------------|---|---|------|---|------|---|------|
| 1.6 Complete: | 1 | = | .... | = | 4 | = | .... |
| | 2 | | 4 |  | .... |  | 16 |

Table 3.5

Did you know?

We call fractions that are equal in size, **equivalent** fractions. The word equivalent means '**the same as**'. Thus the fractions are equal.

Do you remember?

| 1 unit | | | | | | | | | | | |
|----------------|---------------------------------------|----------------|--|----------------|---------------|----------------|--|----------------|--|----------------|--|
| $\frac{1}{2}$ | | | | $\frac{1}{2}$ | | | | | | | |
| $\frac{1}{3}$ | | | | | $\frac{1}{3}$ | | | | | $\frac{1}{3}$ | |
| $\frac{1}{4}$ | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | | $\frac{1}{4}$ | | $\frac{1}{4}$ | |
| $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | | $\frac{1}{5}$ | |
| $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | | $\frac{1}{6}$ | |
| $\frac{1}{7}$ | | $\frac{1}{7}$ | | $\frac{1}{7}$ | | $\frac{1}{7}$ | | $\frac{1}{7}$ | | $\frac{1}{7}$ | |
| $\frac{1}{8}$ | | $\frac{1}{8}$ | | $\frac{1}{8}$ | | $\frac{1}{8}$ | | $\frac{1}{8}$ | | $\frac{1}{8}$ | |
| $\frac{1}{9}$ | | $\frac{1}{9}$ | | $\frac{1}{9}$ | | $\frac{1}{9}$ | | $\frac{1}{9}$ | | $\frac{1}{9}$ | |
| $\frac{1}{10}$ | | $\frac{1}{10}$ | | $\frac{1}{10}$ | | $\frac{1}{10}$ | | $\frac{1}{10}$ | | $\frac{1}{10}$ | |
| $\frac{1}{11}$ | | $\frac{1}{11}$ | | $\frac{1}{11}$ | | $\frac{1}{11}$ | | $\frac{1}{11}$ | | $\frac{1}{11}$ | |
| $\frac{1}{12}$ | | $\frac{1}{12}$ | | $\frac{1}{12}$ | | $\frac{1}{12}$ | | $\frac{1}{12}$ | | $\frac{1}{12}$ | |
| 2.1: | $\frac{1}{2} = \frac{\text{..}}{10}$ | | | | | | | | | | |
| 2.2: | $\frac{2}{3} = \frac{\text{..}}{6}$ | | | | | | | | | | |
| 2.3: | $\frac{\text{..}}{5} = \frac{8}{10}$ | | | | | | | | | | |
| 2.4: | $\frac{1}{4} = \frac{\text{..}}{12}$ | | | | | | | | | | |
| 2.5: | $\frac{\text{..}}{3} = \frac{10}{12}$ | | | | | | | | | | |
| 2.6: | $\frac{4}{10} = \frac{\text{..}}{5}$ | | | | | | | | | | |
| 2.7: | $\frac{1}{3} = \frac{\text{..}}{5}$ | | | | | | | | | | |
| 2.8: | $\frac{\text{..}}{6} = \frac{1}{2}$ | | | | | | | | | | |
| 2.9: | $\frac{3}{6} = \frac{\text{..}}{12}$ | | | | | | | | | | |
| 2.10: | $\frac{4}{6} = \frac{\text{..}}{9}$ | | | | | | | | | | |

Table 3.6

2. The following activity will prepare you for the addition and subtraction of fractions. Use your knowledge of equivalent fractions and answer the following. Where you are in doubt, use the diagram above.

- 2.1: $\frac{1}{2} = \frac{\text{..}}{10}$
- 2.2: $\frac{2}{3} = \frac{\text{..}}{6}$
- 2.3: $\frac{\text{..}}{5} = \frac{8}{10}$
- 2.4: $\frac{1}{4} = \frac{\text{..}}{12}$
- 2.5: $\frac{\text{..}}{3} = \frac{10}{12}$
- 2.6: $\frac{4}{10} = \frac{\text{..}}{5}$
- 2.7: $\frac{1}{3} = \frac{\text{..}}{5}$
- 2.8: $\frac{\text{..}}{6} = \frac{1}{2}$
- 2.9: $\frac{3}{6} = \frac{\text{..}}{12}$
- 2.10: $\frac{4}{6} = \frac{\text{..}}{9}$

3.1.6 Assessment

| |
|---|
| Learning outcomes(LOs) |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and counts, estimates, calculates and checks with competence and confidence in solving problems. |
| <i>continued on next page</i> |

| |
|---|
| Assessment standards(ASs) |
| |
| We know this when the learner: |
| 1.1 counts forwards and backwards fractions; |
| 1.2 describes and illustrates various ways of writing numbers in different cultures (including local) throughout history; |
| 1.3 recognises and represents the following numbers in order to describe and compare them: |
| <ul style="list-style-type: none"> • common fractions to at least twelfths; |
| 1.5 recognises and uses equivalent forms of the numbers listed above, including: |
| 1.5.1 common fractions with denominators that are multiples of each other; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as: |
| <ul style="list-style-type: none"> • financial (including buying and selling, profit and loss, and simple budgets); |
| LO 5 |
| Data handling The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation. |
| We know this when the learner: |
| 5.3 organises and records data using tallies and tables; |
| 5.5 draws a variety of graphs to display and interpret data (ungrouped) including: |
| <ul style="list-style-type: none"> • a pie graph. |

Table 3.7

3.1.7 Memorandum

ACTIVITY 1

1.1 Equal parts of a whole

1.2 Nominator

1.3

1.4 Say in how many equal parts the whole is divided

1.5 Smaller

1.6 Nominator

1.7 Equivalents

1.8 Larger

1.9 Say with how many equal parts I work / are coloured in

1.10 Divide the nominator and denominator by the same number

2. 2.1 b and c

- c and e
- a en b

2.4 Not equal parts

- 2.5 (i) $\frac{1}{4}$
(ii) $\frac{2}{8} / \frac{1}{4}$
(iii) $\frac{4}{8} / \frac{1}{2}$
(iv) $\frac{3}{8}$
(v) $\frac{1}{2}$
(vi) $\frac{1}{8}$
(vii) $\frac{2}{10} / \frac{1}{5}$
(viii) $\frac{4}{10} / \frac{2}{5}$
(ix) $\frac{3}{10}$
(x) $\frac{2}{5}$
(xi) $\frac{1}{5}$

ACTIVITY 2

1.

| | | | | | |
|---|----|---|------------------------------|----|-------------------------------|
| B | 8 | 1 | $\frac{1}{8}$ | 7 | $\frac{7}{8}$ |
| C | 6 | 1 | $\frac{1}{6}$ | 5 | $\frac{5}{6}$ |
| D | 8 | 1 | $\frac{1}{8}$ | 7 | $\frac{7}{8}$ |
| E | 3 | 1 | $\frac{1}{3}$ | 2 | $\frac{2}{3}$ |
| F | 12 | 6 | $\frac{6}{12} / \frac{1}{2}$ | 6 | $\frac{6}{12} / \frac{1}{2}$ |
| G | 16 | 8 | $\frac{8}{16} / \frac{1}{2}$ | 8 | $\frac{8}{16} / \frac{1}{2}$ |
| H | 16 | 4 | $\frac{4}{16} / \frac{1}{4}$ | 12 | $\frac{12}{16} / \frac{3}{4}$ |
| I | 8 | 2 | $\frac{2}{8} / \frac{1}{4}$ | 6 | $\frac{6}{8} / \frac{3}{4}$ |
| J | 12 | 6 | $\frac{6}{12} / \frac{1}{2}$ | 6 | $\frac{6}{12} / \frac{1}{2}$ |
| K | 8 | 2 | $\frac{2}{8} / \frac{1}{4}$ | 6 | $\frac{6}{8} / \frac{3}{4}$ |

Table 3.8

ACTIVITY 4

1.5 Fractions all equal

- 1.6 $\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16}$
2. $2.1 \frac{5}{10} 2.6 \frac{2}{5}$
2.2 $\frac{4}{6} 2.7 \frac{3}{9}$
2.3 $\frac{8}{10} 2.8 \frac{1}{2}$
2.4 $\frac{3}{12} 2.9 \frac{6}{12}$
2.5 $\frac{10}{12} 2.10 \frac{6}{9}$
3. $3.1 \frac{12}{21} 3.4 \frac{15}{18}$
3.2 $\frac{14}{16} 3.5 \frac{9}{10}$
3.3 $\frac{4}{5} 3.6 \frac{21}{27}$
4. $\frac{10}{12} = \frac{5}{6} \frac{2}{3} = \frac{6}{9} \frac{2}{3} = \frac{4}{6}$
 $\frac{3}{4} = \frac{6}{8} \frac{8}{10} = \frac{4}{5} \frac{3}{10} = \frac{6}{20}$

3.2 Recognise and classify ordinary fractions²

3.2.1 MATHEMATICS

3.2.2 Grade 5

3.2.3 ORDINARY AND DECIMAL FRACTIONS

3.2.4 Module 46

3.2.5 RECOGNISE AND CLASSIFY ORDINARY FRACTIONS

3.2.5.1 Activity 1:

3.2.5.2 To recognise and classify ordinary fractions in order to compare them [LO 1.3.2]

RELATIONSHIP SIGNS ($<$; $>$; $=$)

1. Compare the following fractions and then fill in $<$, $>$ or $=$.

$$\begin{array}{ll} 1.1 \frac{3}{5} < \frac{7}{10} \\ 1.2 \frac{1}{3} < \frac{1}{4} \\ 1.3 \frac{5}{8} < \frac{1}{2} \\ 1.4 \frac{1}{5} < \frac{1}{3} \\ 1.5 \frac{3}{4} < \frac{8}{8} \\ 1.6 \frac{3}{8} < \frac{1}{2} \\ 1.7 \frac{3}{4} < \frac{9}{12} \\ 1.8 \frac{3}{5} < \frac{7}{10} \\ 1.9 \frac{2}{11} < \frac{1}{12} \\ 1.10 \frac{12}{12} = \frac{9}{9} \end{array}$$

2. Compare the following fractions and draw a circle around the one that is the greatest in each of the following:

$$\begin{array}{ll} 2.1 \frac{1}{2} ; \frac{3}{4} \\ 2.2 \frac{2}{3} ; \frac{3}{5} \\ 2.3 \frac{3}{5} ; \frac{9}{10} \\ 2.4 \frac{1}{2} ; \frac{2}{6} \\ 2.5 \frac{3}{8} ; \frac{1}{2} \\ 2.6 \frac{4}{5} ; \frac{4}{10} \end{array}$$

Class discussion

HOW can we determine the answers for no. 1 and if we don't have a diagram to help us?

3. In the following activity you will see how important your knowledge of equivalent fractions is. Once you have mastered it, you will find that it is child's play to compare the fractions with each other.

Use the rule as determined during your class discussion and fill in $<$, $>$ or $=$.

$$\begin{array}{ll} 3.1 \frac{3}{5} < \frac{7}{15} \\ 3.2 \frac{7}{11} < \frac{13}{22} \\ 3.3 \frac{5}{9} < \frac{15}{27} \\ 3.4 \frac{9}{6} < \frac{20}{24} \end{array}$$

4. Now use your knowledge and fill in $<$, $>$ or $=$.

$$\begin{array}{ll} 4.1 \frac{4}{5} < \frac{5}{6} \\ 4.2 \frac{2}{3} < \frac{4}{5} \\ 4.3 \frac{5}{6} < \frac{9}{8} \\ 4.4 \frac{7}{8} < \frac{6}{7} \end{array}$$

²This content is available online at <<http://cnx.org/content/m30939/1.1/>>.

3.2.5.3 To calculate by selecting and using operations [LO 1.8.3]

1. Split up into groups of three. See if you know how to solve the problems.

1.1 Gizelle and her twin brother, Donovan, receive pocket money every month. Gizelle saves two sixths of her pocket money. Donovan saves four ninths of his. Who saves most if they get the same amount of pocket money?

1.2 Mom likes making pancakes. She gives Jake and his friends three quarters to eat. Then Mom makes the same number of pancakes. She sends four fifths of the pancakes to school for Dimitri and his friends to enjoy. Who got the most pancakes from Mom?

1.3 Vusi and Sipho wrote the same test. Vusi answered four sevenths of the questions correctly. Sipho had five eighths right. Who did better in the test?

1.4 Two identical taxis transport passengers between Johannesburg and Pretoria. The one taxi is two thirds full, while the other one is three quarters full. Which taxi transports the most passengers?

Another BRAIN-TEASER!

Arrange the following fractions from biggest to smallest:

$$\frac{2}{3}; \frac{1}{2}; \frac{5}{6}; \frac{7}{9}$$

SIMPLIFYING

Did you know?

In order to write a fraction in its simplest form we divide the numerator and denominator by the same number. The value of the fraction does not change because we are actually dividing the fraction by 1.

| | | | | | | | | |
|------|-----------------|-------------------|---------------|-----|-----------------|--|-----------|---------------|
| E.g. | $\frac{18}{24}$ | [U+FOB8][U+F0B8]6 | $\frac{3}{4}$ | and | $\frac{10}{15}$ | | [U+F0B8]5 | $\frac{2}{3}$ |
| | | [U+F0B8] 6 | | | | | [U+F0B8]5 | |

Table 3.9

3.2.5.4 Activity 3:

3.2.5.5 To simplify common fractions [LO 1.3.2]

1. Now that you know how to simplify a fraction, see whether you can complete the following table:

| | Fraction | ÷ by | Simplified |
|------|-----------------|---------------|---------------|
| E.g. | $\frac{18}{27}$ | $\frac{9}{9}$ | $\frac{2}{3}$ |
| 1.1 | $\frac{40}{45}$ | ..... | ..... |
| 1.2 | $\frac{15}{25}$ | ..... | ..... |
| 1.3 | $\frac{12}{16}$ | ..... | ..... |
| 1.4 | $\frac{24}{30}$ | ..... | ..... |
| 1.5 | $\frac{48}{54}$ | ..... | ..... |

Table 3.10

3.2.5.6 Activity 4:

3.2.5.7 To use a series of techniques to do calculations [LO 1.10.3]

1. In the previous modules you often rounded off whole numbers. Now we are going to round off mixed numbers to the nearest whole number. Connect the number in column A to the correct answer in column B.

| | ANumber | | BRounded off to the nearest whole number |
|------|-----------------|---|--|
| E.g. | $2\frac{8}{10}$ | → | 3 |
| 1.1 | $3\frac{1}{6}$ | | 5 |
| 1.2 | $3\frac{5}{8}$ | | 2 |
| 1.3 | $4\frac{7}{9}$ | | 7 |
| 1.4 | $2\frac{2}{5}$ | | 3 |
| 1.5 | $6\frac{1}{8}$ | | 4 |
| 1.6 | $7\frac{1}{4}$ | | 6 |

Table 3.11

Activity 5:

3.2.5.8 To calculate through selection and use of suitable computations [LO 1.8.3]

1.1 Now answer the following questions:

a) $\frac{1}{5} + \frac{3}{5} = \dots$

b) $1\frac{1}{5} + \frac{2}{5} = \dots$

c) $\frac{2}{5} + \frac{4}{5} = \dots$

d) $1\frac{1}{5} + \frac{1}{5} = \dots$

e) Calculate:

$\frac{2}{3} + \frac{7}{9}; \frac{4}{5} + \frac{9}{10}$

$\frac{5}{6} + \frac{2}{3}; \frac{7}{8} + \frac{2}{4}$

$\frac{5}{8} + \frac{1}{2}; \frac{1}{4} + \frac{5}{8}$

3.2.5.9 Activity 6:

3.2.5.10 To calculate through selection and the use of suitable computations [LO 1.8.3]

3.2.5.11 To recognise and use equivalent forms of fractions [LO 1.5.1]

3.2.5.12 To write number sentences in order to describe a problem situation [LO 2.4]

1. Split up into groups of three. Work through the following problems and see if you can find solutions:

a) A farmer transports his fruit to the market by lorry. On arrival he discovers the following: one quarter of the bananas, one eighth of the apples and three eighths of the pears have become spoiled. Which fraction of the fruit could not be off-loaded to be sold at the market?

b) The learners of the Khayelitsha Primary School decided to add some colour to the informal settlement nearby. They painted two fifths of the shacks yellow. Later three tenths of the remaining shacks were painted blue.

i) What fraction of all the shacks was painted?

ii) What fraction still had to be painted?

iii) Which colour would you paint them and why?

c. Mrs Johnny decided to start a soup kitchen in her area.

i) If she gives 5 and seven ninths of the pea soup, and 3 and two thirds of the bean soup to less privileged people on a certain day, what fraction of the soup is eaten altogether on that specific day?

ii) What is your favourite kind of soup?

d. It takes 2 and a half hours to fly from Cape Town to Johannesburg. A flight from Johannesburg to London takes 9 and three quarters of an hour. How long will it take you altogether to fly to London if you depart from Cape Town? Give your answer as a mixed number.

- e. Mrs Zuqa makes delicious fruit juices to give to the learners at school during break. She mixes 4 and three quarters of orange juice with 1 and a half litre of pineapple juice. What is the difference between these two quantities?
- f. Mrs Sonn helps her friend to bake cakes for the learners. She buys 5 kg of sugar and uses 3 and a third of this quantity. How many kilograms of sugar are left?
2. Your teacher will now ask you to explain one of the above-mentioned problems to the rest of the class.
3. Compare your solutions to those of other groups in the class.
4. Discuss the differences and / or similarities between the different methods that were used.

3.2.6 Assessment

| |
|---|
| Learning outcomes(LOs) |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and counts, estimates, calculates and checks with competence and confidence in solving problems. |
| Assessment standards(ASs) |
| We know this when the learner: |
| 1.1 counts forwards and backwards fractions; |
| 1.2 describes and illustrates various ways of writing numbers in different cultures (including local) throughout history; |
| 1.3 recognises and represents the following numbers in order to describe and compare them: |
| <ul style="list-style-type: none"> • common fractions to at least twelfths; |
| 1.5 recognises and uses equivalent forms of the numbers listed above, including: |
| 1.5.1 common fractions with denominators that are multiples of each other; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as: |
| <ul style="list-style-type: none"> • financial (including buying and selling, profit and loss, and simple budgets); |

Table 3.12

3.2.7 Memorandum

ACTIVITY 1

- 1.
- 1.1 < 1.2 >
- 1.3 > 1.4 <
- 1.5 = 1.6 <
- 1.7 = 1.8 <
- 1.9 > 1.10 =

$$\begin{array}{ll} 2. \quad 2.1 \frac{3}{4} & 2.2 \frac{2}{3} \\ 2.3 \frac{9}{10} & 2.4 \frac{1}{2} \\ 2.5 \frac{1}{2} & 2.6 \frac{4}{5} \end{array}$$

CLASS DISCUSSION

First make both nominators the same by finding the smallest common denominator
OR

First simplify the fraction, if you can

$$3. \quad 3.1 >$$

$$3.2 >$$

$$3.3 =$$

$$3.4 =$$

$$4. \quad 4.1 <$$

$$4.2 <$$

$$4.3 >$$

$$4.4 >$$

Another BRAIN-TEASER!

$$\frac{5}{6}, \frac{7}{9}, \frac{2}{3}, \frac{1}{2}$$

ACTIVITY 3

1.

| | | |
|-----|---------------|---------------|
| 1.1 | $\frac{5}{5}$ | $\frac{8}{9}$ |
| 1.2 | $\frac{5}{5}$ | $\frac{3}{5}$ |
| 1.3 | $\frac{4}{4}$ | $\frac{3}{4}$ |
| 1.4 | $\frac{6}{6}$ | $\frac{4}{5}$ |
| 1.5 | $\frac{6}{6}$ | $\frac{8}{9}$ |

Table 3.13

ACTIVITY 4

1.

- $3 \frac{1}{6} \rightarrow 3 \quad 1.2 \quad 3 \frac{5}{8} \rightarrow 4$

$$1.3 \quad 4 \frac{7}{9} \rightarrow 5 \quad 1.4 \quad 2 \frac{2}{5} \rightarrow 2$$

$$1.5 \quad 6 \frac{1}{8} \rightarrow 6 \quad 1.6 \quad 7 \frac{1}{4} \rightarrow 7$$

BRAIN-TEASER!

9

ACTIVITY 5

1.1

- a) $1 \frac{4}{5}$;
- b) $1 \frac{3}{5}$;
- c) $1 \frac{1}{5}$;
- d) $1 \frac{2}{5}$
- e) (i) $1 \frac{4}{9}$
 (ii) $1 \frac{7}{10}$
 (iii) $1 \frac{1}{2}$
 (iv) $1 \frac{2}{8}$
 (v) $1 \frac{1}{8}$
 (vi) $1 \frac{7}{8}$

3.3 Selection and computations³

3.3.1 MATHEMATICS

3.3.2 Grade 5

3.3.3 ORDINARY AND DECIMAL FRACTIONS

3.3.4 Module 47

3.3.5 SELECTION AND COMPUTATIONS

3.3.5.1 Activity 1:

3.3.5.2 To calculate through selection and by using suitable computations [LO 1.8.3]

3.3.5.3 To describe observed relationships and rules in your own words [LO 2.2]

1. Look carefully at the following problems and explain to a friend what your approach would be in calculating the various answers.

$$1.1 \frac{7}{8} - \frac{3}{4}$$

$$1.2 \frac{11}{12} - \frac{2}{3}$$

$$1.3 \frac{5}{6} - \frac{9}{12}$$

$$1.4 2\frac{1}{2} - 1\frac{9}{10}$$

$$1.5 3\frac{1}{5} - 1\frac{7}{10}$$

$$1.6 4\frac{1}{4} - 2\frac{7}{8}$$

Now calculate the answers.

2. Check your answers with your friend.

3.3.5.4 Activity 2:

3.3.5.5 To calculate through selection and by using suitable computations [LO 1.8.6]

3.3.5.6 To determine, through comparison and discussion, the equivalence and validity of different representations of the same problem [LO 2.6.2]

3.3.5.7 To describe observed relationships and rules in your own words [LO 2.2]

1. Sometimes one can use a pie graph to represent fractions. A survey was done of the extramural activities of a Grade 5 class and the results were represented by using a pie graph. See whether you can “read” it, and then complete the table.

³This content is available online at <<http://cnx.org/content/m30942/1.1/>>.

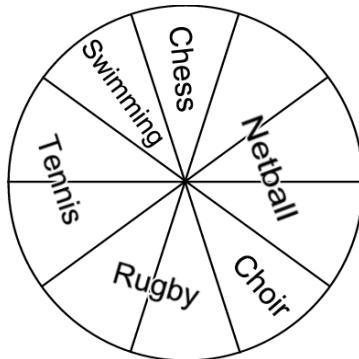


Figure 3.13

| | | | | | | |
|----------|---------|--------|-------|-------|-------|----------|
| Activity | Netball | Tennis | Rugby | Choir | Chess | Swimming |
| Fraction | ..... | ..... | ..... | ..... | ..... | ..... |

Table 3.14

2. It is important for us to be able to interpret the pie graph, otherwise we will not be able to make meaningful deductions from it and solve the problems. Work through the following problem with a friend and find out how many methods can be used to solve it.

If there are 50 learners in the class, how many learners play netball?

2.1 The question is $\frac{3}{10}$ of 50

$$\frac{1}{10} \text{ of } 50 = 5$$

$\frac{3}{10}$ of 50 will be 15

2.2 I must calculate $\frac{3}{10}$ of 50. I find out what $\frac{1}{10}$ is by dividing 50 by 10.

$$50 \div 10 = 5$$

If one tenth is 5, then 3 tenths will be 3×5 . There are thus 15 pupils who play netball.

2.3 Girls = $\frac{3}{10}$ of 50

$$\text{Thus: } = (50 \div 10) \times 3$$

$$= 5 \times 3$$

$$= 15$$

2.4 $\frac{3}{10}$ of 50 = $3 \times \frac{1}{10}$ of 50

$$= 3 \times 5$$

$$= 15$$

3. What would you say is the “rule” for these “of” sums?

4. Which of these methods do you prefer?

Why?

5. Look again at the methods at 2.1 and 2.2. What do you notice?

6. Can you say how many learners in Act. 2 participate in:

rugby? _____ ; swimming? _____

7 Now calculate:

7.1 $\frac{7}{12}$ of 36

7.2 $\frac{5}{8}$ of 32

7.3 $\frac{6}{7}$ of 350

7.4 $\frac{3}{4}$ of 224

Do you still remember?

1 000 m. = 1 litre

1 000 litre = 1 kℓ

1 000 g = 1 kg

1 000 kg = 1 t

1 000 mm = 1 m

1 000 m = 1 km

3.3.5.8 Activity 3:

3.3.5.9 To calculate through selection and by using suitable computations [LO 1.8.6]

1. Let us see whether you are able to successfully apply the knowledge that you have acquired up to now. Work on your own and calculate:

1.1 Five learners share 1 litre of cool drink equally. How many m ℓ does each learner get?

1.2 Zane lives 2 km from the school. He has already covered $\frac{3}{4}$ of the distance. How far has he walked? (Give your answer in m).

1.3 The mass of a bag of flour is 1 kg. Mom needs $\frac{3}{10}$ of this to bake a cake. How much flour will she use?

1.4 Joy buys 3 m of material but only uses $\frac{1}{6}$ of this to make a dress.

What fraction of material is left over?

How much material is left over?

3.3.5.10 Activity 4:

- To use tables and graphs to arrange and record data [LO 5.3]
- To draw and interpret a graph [LO 5.5.1]

1. The following activity is for your portfolio.

Look carefully at the assessment table before you begin – your teacher will allocate a code from 1 - 4 for the different sections.

Challenge!

1.1 Carry out a survey in your class and find out how many learners read which magazines. Write you information down in a table, e.g.

| Magazine | You | Time | SA Runner | Fair Lady |
|--------------------|-------|-------|-----------|-----------|
| Number of learners | | | | |

Table 3.15

1.2 Now show the information by means of a pie diagram.

1.3 Answer the following questions:

- Which magazine is the most popular?
- Which magazine is read the least?
- Which magazine is YOUR favourite?

Why?

BRAIN-TEASER!

Who am I?

- If you subtract me from $\frac{1}{2}$, you will get $\frac{3}{8}$
- If you cut me into sixths, you will have $\frac{24}{6}$
- If you double me, you will get $4 \frac{1}{2}$

- a) If you halve me, you will get $2\frac{1}{12}$
- b) If you calculate $\frac{3}{4}$ of me, you will get 12

3.3.5.11 Activity 5:

3.3.5.12 To solve problems in context [LO 1.6.1]

Split up into groups of three. You will be given the necessary paper to work on. Remember to discuss the solutions amongst yourselves beforehand and then you can do them neatly on paper.

1. Mrs Mvusi buys 7 metres of material. If she wants to make each one of her four children a bright cushion for his or her room, how many metres of material can she use for each one? (All the cushions are of the same size.) Give each answer as a fraction.

2. Mr Muruvan buys 9 pieces of dry sausage that he wants to share equally among himself, his wife and their five children. What fraction of the sausage will each one get?

3. Grandpa Ben would like to divide R30 equally among his four grandchildren. What is the amount each one will get?

- a) Did she divide it fairly?
- b) What fraction does each person get?
- c) Write your answer as an improper fraction:

1.3 Sketch the solutions to the following:

- a) Divide eight fizzers equally between five children.
- b) Divide five milk tarts equally between 12 guests.

1.4 Calculate the following:

- a) Divide R5,00 equally between four children.
- b) Divide 13 pies equally between eight learners.

3.3.5.13 Activity 6:

3.3.5.14 To use a series of techniques to do calculations [LO 1.10.5]

1. It is important for us to know how to key in ordinary fractions on a pocket calculator. This will help us find the answers to problems in no time.

Did you know?

If you want to show a fraction on the calculator, e.g. $\frac{5}{7}$ you must key in $5 \div 7 =$.

1.1 How does the calculator show the following fractions? Write down what you key in.

- a) $\frac{3}{5}$ -----
- b) $\frac{6}{7}$ -----
- c) $\frac{5}{8}$ -----
- d) $\frac{1}{12}$ -----
- e) $\frac{3}{4}$ -----

BRAIN-TEASER!

There are seven cows in a camp. Isolate them by means of three fences so that each cow is in its own small camp.

Indicate with a coloured pencil crayon where you would put the fences.

3.3.6 Assessment

| |
|---|
| Learning outcomes(LOs) |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and counts, estimates, calculates and checks with competence and confidence in solving problems. |
| Assessment standards(ASs) |
| We know this when the learner: 1.1 counts forwards and backwards fractions; 1.2 describes and illustrates various ways of writing numbers in different cultures (including local) throughout history; 1.3 recognises and represents the following numbers in order to describe and compare them: <ul style="list-style-type: none">• common fractions to at least twelfths; 1.5 recognises and uses equivalent forms of the numbers listed above, including: 1.5.1 common fractions with denominators that are multiples of each other; 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as: <ul style="list-style-type: none">• financial (including buying and selling, profit and loss, and simple budgets); |
| LO 5 |
| Data handlingThe learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation. |
| We know this when the learner: 5.3 organises and records data using tallies and tables; |

Table 3.16

3.3.7 Memorandum

ACTIVITY 1

$$\begin{aligned}1. & 1.1 \frac{1}{8} 1.2 \frac{3}{12} = \frac{1}{4} \\2. & 1.3 \frac{3}{12} = \frac{1}{4} 1.4 \frac{6}{10} = \frac{3}{5} \\3. & 1.5 1\frac{5}{10} = 1\frac{1}{2} 1.6 1\frac{3}{8}\end{aligned}$$

ACTIVITY 2

1. It is the same
 2. 10 ; 5
- 7.1: 21
7.2; 20

- :300

7.4 :168
ACTIVITY 3

1. 1.1: 200 ml

1.2: 1 500 m

1.3: 300 g

1.4; $\frac{5}{6}$

1.5: 2 500 mm or 2,5 m or $2\frac{1}{2}$ m

BRAIN-TEASER!

a) $\frac{1}{8}$

a) 4

b) $2\frac{1}{4}$

c) $4\frac{1}{6}$

d) 16

1.4 a) R1,25 / 125c

a) $1\frac{5}{8}$

ACTIVITY 7

1.1 a) $3\frac{5}{5} = 0,6$

a) $6\frac{7}{7} = 0,8571428$

b) $5\frac{8}{8} = 0,625$

c) $1\frac{12}{12} = 0,0833333$

d) $3\frac{4}{4} = 0,75$

3.4 Recognise, classify, represent and describe numbers⁴

3.4.1 MATHEMATICS

3.4.2 Grade 5

3.4.3 ORDINARY AND DECIMAL FRACTIONS

3.4.4 Module 48

3.4.5 RECOGNISE, CLASSIFY, REPRESENT AND COMPARE NUMBERS

3.4.5.1 Activity 1:

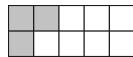
3.4.5.2 To recognise, classify, represent and compare numbers [LO 1.3.3]

3.4.5.3 To recognise and use equivalent forms of numbers [LO 1.5.2]

1. You have just completed a learning unit on ordinary fractions. Let us do some revision.
What fraction in each of the following figures is coloured in?

1.1

⁴This content is available online at <<http://cnx.org/content/m30946/1.1/>>.

**Figure 3.14**

1.2

**Figure 3.15**

1.3

**Figure 3.16**

2. Write the answers above as decimal fractions.

3.4.5.4 TENTHS

Refresh your memory!

We read 0,3 as **nought comma three** and we call it a **decimal fraction**.

The comma is called the **decimal sign** and it separates the whole numbers from the fractions.

Do you still remember?

$$\frac{1}{10}$$

| | | | | | $\times 10$ | $\times 10$ | $\times 10$ | $\times 10$ |
|-----------|----------|------|-------|--------|-------------|-------------|-------------|-------------|
| Thousands | Hundreds | Tens | Units | Tenths | | | | |
| T | H | T | U | t | | | | |
| 1 000 | 100 | 10 | 1 | 0,1/ | $\div 10$ | $\div 10$ | $\div 10$ | $\div 10$ |

Figure 3.17

3. Look at the number line and fill in the missing numbers.



Figure 3.18

4. Work together with a friend. Count aloud and complete the following:

- 4.1 0,2 ; 0,4 ; 0,6 ; ; ; ; ;
 4.2 4,7 ; 4,5 ; 4,3 ; ; ; ; ;
 4.3 0,5 ; 1,5 ; ; ; ; ;
 4.4 3,6 ; 3,2 ; ; ; ; ;
 4.5 9,2 ; 9,1 ; ; ; ; ;

Do you still remember?

If I want to add 0,3 to the previous number repeatedly I can programme my calculator in this way:
Number + 0,3 + == =

3.4.5.5 Activity 2 :

3.4.5.6 To use a series of techniques to do mental arithmetic [LO 1.10.5]

By now you know that we can use the pocket calculator very effectively to find or check answers. Now that you have seen how to programme your pocket calculator or to add on, try to complete the following activity without making any mistakes. Programme your pocket calculator and write the first 10 answers to the following:

- 1.1 Start at 3,7 and add 0,6 each time:
 1.2 Start at 9,3 and subtract 0,4 each time:

3.4.5.7 Activity 3:

- To recognise, classify and represent numbers in order to describe and compare them [LO 1.3.3]
- To recognise and use equivalent forms of numbers [LO 1.5.2]
- To use a series of techniques to do mental arithmetic [LO 1.10.5]

In this activity we would like to see whether you can determine which ordinary fractions (mixed numbers) fit in with which decimal fractions. It is important for you to be able to see that $0,2\text{kg}$ is actually exactly the same as $\frac{2}{10}\text{ kg}$!

1. Link the ordinary fractions to their decimal fraction partners. Connect column A to the correct answer in column B.

| | A | B |
|------|----------------------|--|
| E.g. | $0,2\text{ kg}$ | $1 \frac{5}{10} / 1 \frac{1}{2}\text{ km}$ |
| 1.1 | $0,5\text{ m}$ | $152 \frac{7}{10}\text{ km}$ |
| 1.2 | $17,6\text{ litre}$ | $\frac{2}{10}\text{ kg}$ |
| 1.3 | $8,4\text{ seconds}$ | $8 \frac{4}{10}\text{ sec}$ |
| 1.4 | $152,7\text{ km}$ | $17 \frac{6}{10}\ell$ |
| 1.5 | $1,5\text{ km}$ | $\frac{5}{10} / \frac{1}{2}\text{ m}$ |

Table 3.17

Challenge!

2. Work with a friend. Write the following fractions as decimal fractions:

$$\begin{array}{ll} 2.1 \frac{4}{5} & 2.2 \frac{2}{20} \\ 2.3 \frac{3}{5} & 2.4 \frac{7}{20} \\ 2.5 \frac{18}{30} & 2.6 \frac{48}{60} \end{array}$$

3. Explain what must be done to get the above answers.

4. How can you check your answers with a calculator?

5. Now use a calculator to check your answers in no. 2.

3.4.5.8 Activity 4:**3.4.5.9 To be capable of doing mental arithmetic [LO 1.9]**

1. You now have the opportunity of improving your mental arithmetic skills and applying your newly acquired knowledge. Complete the following mental arithmetic test as quickly and as accurately as possible:

| | |
|----------------------------|---------------------------------|
| | |
| 1.1 $19 + 21 + 17 = \dots$ | 1.11 $\dots \div 5 = 8$ |
| 1.2 $125 + 175 = \dots$ | 1.12 $45 \div \dots = 5$ |
| 1.3 $1\ 004 - 9 = \dots$ | 1.13 $\dots \div 9 = 8$ |
| 1.4 Halve 196 : \dots | Write as a decimal fraction: |
| 1.5 Double 225 : \dots | 1.14 $13 \frac{4}{10} : \dots$ |
| 1.6 $7 \times 4 = \dots$ | 1.15 $124 \frac{7}{10} : \dots$ |
| 1.7 $3 \times 8 = \dots$ | 1.16 $1 \frac{4}{5} : \dots$ |
| 1.8 $\dots \times 5 = 45$ | 1.17 $2 \frac{14}{20} : \dots$ |
| 1.9 $\dots \times 6 = 42$ | Write as a decimal fraction: |
| 1.10 $24 \div 4 = \dots$ | 1.18 $4,9 : \dots$ |
| | 1.19 $12,8 : \dots$ |
| | 1.20 $109,2 : \dots$ |
| | |

Table 3.18

3.4.5.10 HUNDREDTHS

Look carefully at the following:

$$100 \text{ c} = \text{R}1,00$$

$$1\text{c} = \frac{1}{100} \text{ of a rand}$$

$$1\text{c} = \text{R} \frac{1}{100} \text{ R}0,01$$

3.4.5.11 Activity 5:

3.4.5.12 To recognise, classify and represent numbers in order to describe and compare them [LO 1.3.3]

3.4.5.13 To recognise and use equivalent forms of numbers [LO 1.5.2]

1. By now you have probably discovered that when we work with rand and cents we are actually working with hundredths! Look carefully at the example above and than write the following in rand:

$$1.1 \ 4 \text{ c} \dots$$

$$1.2 \ 38 \text{ c} \dots$$

$$1.3 \ 2 \text{ c} \dots$$

$$1.4 \ 303 \text{ c} \dots$$

$$1.5 \ 460 \text{ c} \dots$$

Did you know?

$\frac{1}{100}$ is written like this as a decimal fraction: 0,01. We read it as **nought comma nought one**. If we have less than $\frac{10}{100}$ we must write 0 (nought) as a **place-holder** after the decimal comma, in the place of the tenths.

Let us look again at our number system:

$$\frac{1}{100}$$

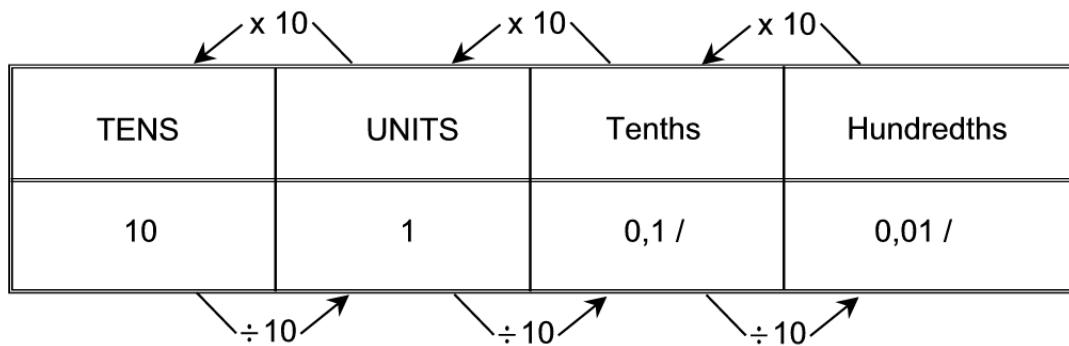


Figure 3.19

2. What fraction of the following is NOT coloured in? Write it also as a decimal fraction.
2.1
-



Figure 3.20

2.2



Figure 3.21

2.3



Figure 3.22

2.4



Figure 3.23

2.5



Figure 3.24

2.6



Figure 3.25

3.4.6 Assessment

| |
|--|
| Learning outcomes(LOs) |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. |
| <i>continued on next page</i> |

| |
|---|
| Assessment standards(ASs) |
| We know this when the learner: |
| 1.3 recognises and represents the following numbers in order to describe and compare them: 1.3.3 decimal fractions of the form 0,5; 1,5; 2,5, and so on, in the context of measurement; |
| 1.5 recognises and uses equivalent forms of the numbers listed above, including: 1.5.2 decimal fractions of the form 0,5, 1,5 and 2,5, and so on, in the context of measurement; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as: <ul style="list-style-type: none"> • measurements in Natural Sciences and Technology contexts; |
| 1.8 estimates and calculates by selecting and using operations appropriate to solving problems that involve: <ul style="list-style-type: none"> • (additional) addition of positive decimals with 2 decimal places; |
| 1.9 performs mental calculations involving: 1.9.1 addition and subtraction; 1.9.2 multiplication of whole numbers to at least 10×10 ; |
| 1.10 uses a range of techniques to perform written and mental calculations with whole numbers including: <ul style="list-style-type: none"> • building up and breaking down numbers; • using a calculator; |
| 1.11 uses a range of strategies to check solutions and judge the reasonableness of solutions; |

Table 3.19

3.4.7 Memorandum

ACTIVITY 1

1. 1.1: $\frac{3}{10}$

1.2: $\frac{6}{10}$

1.3: $\frac{9}{10}$

2. 2.1: 0,03

• :0,6

2.3: 0,9

3. $\frac{4}{10}; \frac{5}{10}; \frac{6}{10}; \frac{8}{10}; 1\frac{1}{10}; 1\frac{3}{10}; 1\frac{4}{10}; 1\frac{5}{10}$
0,3; 0,7; 0,9; 1,2; 1,3

4. 4.1: 31,5

• :312,4

• :402,6

• :650,2

5. 5.1: 0,8; 1; 1,2; 1,4; 1,6
 5.2: 4,1; 3,9; 3,7; 3,5; 3,3
 5.3: 2,5; 3,5; 4,5; 5,5; 6,5
 5.4: 2,8; 2,4; 2; 1,6; 1,2
 5.5: 9; 8,9; 8,8; 8,7; 8,6

ACTIVITY 2

- 1.1: 4,3; 4,9; 5,5; 6,1; 6,7; 7,3; 7,9; 8,5; 9,1; 9,7
 1.2: 8,9; 8,5; 8,1; 7,7; 7,3; 6,9; 6,5; 6,1; 5,7; 5,3

ACTIVITY 3

1. 1.1: $\frac{5}{10} / \frac{1}{2}$

- : $17\frac{6}{10}$
- : $8\frac{4}{10}$
- : $152\frac{7}{10}$
- : $1\frac{5}{10} / 1\frac{1}{2}$

2. 2.1: 0,8

- : 0,1
- : 0,6
- : 0,35
- : 0,6
- : 0,8

3. Change denominator to 10 or 100 (equivalent fractions)

4. Numerator + denominator =

ACTIVITY 4

12. 1.1: 57; 1.11: 40

- : 300; 1.12: 9
- : 995; 1.13: 72
- : 98; 1.14: 13,4
- : 510; 1.15: 124,7
- : 28; 1.16: 1,8
- : 24; 1.17: 2,7
- : 9; 1.18: $4\frac{9}{10}$
- : 7; 1.19: $12\frac{8}{10}$
- : 6; 1.20: $09\frac{2}{10}$

ACTIVITY 5

1. 1.1: R0,04

- : R0,38
- : R0,02
- : R3,03
- : R4,60

2. 2.1: $\frac{86}{100} = 0,86$
 2.2 $\frac{72}{100} = 0,72$
 2.3 $\frac{44}{100} = 0,44$
 2.4 : $\frac{3}{100} = 0,03$
 2.5: $\frac{10}{100} = 0,10$
 2.6 : $\frac{70}{100} = 0,70$

3.5 Tables and checks to arrange and record data⁵

3.5.1 MATHEMATICS

3.5.2 Grade 5

3.5.3 ORDINARY AND DECIMAL FRACTIONS

3.5.4 Module 49

3.5.5 TABLES AND CHECKS TO ARRANGE AND RECORD DATA

3.5.5.1 Activity 1:

3.5.5.2 To use tables and checks to arrange and record data [LO 5.3]

1. Use your existing knowledge to complete the following table:

| | T | U | t | h | = | $5 \frac{98}{100}$ | = | 5,98 |
|------|---|---|---|---|---|--------------------|---|-------|
| E.g. | | 5 | 9 | 8 | = | $5 \frac{98}{100}$ | = | 5,98 |
| 1.1 | | | 3 | 6 | = | ----- | = | ----- |
| 1.2 | | 1 | | 7 | = | ----- | = | ----- |
| 1.3 | | 3 | 6 | | = | ----- | = | ----- |
| 1.4 | 4 | 2 | 8 | 5 | = | ----- | = | ----- |
| 1.5 | 4 | 7 | 0 | 3 | = | ----- | = | ----- |

Table 3.20

Brain-teaser!

What will the following fractions look like if written as decimal fractions on the calculator?

1. $\frac{3}{100}$ -----
2. $\frac{9}{100}$ -----
3. $\frac{40}{100}$ -----
4. $\frac{80}{100}$ -----
5. $\frac{37}{100}$ -----
6. $\frac{59}{100}$ -----

How do the answers of 3 and 4 differ from the rest?

Why is this?

Did you know?

Normally we don't write the noughts at the end of decimal fractions, but in the following cases we do:

a) When we work with **money**: R8,60 (shows how many cents there are).

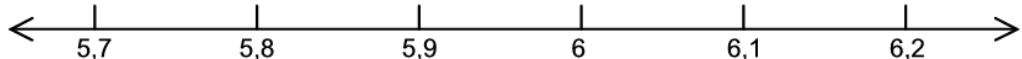
b) When we **time** an athlete with a **stop-watch**: 7,30 seconds. This is how we give results to the hundredth of a second.

- a) When Mom buys **material**: 1,70 m (so that the saleslady knows exactly how many cm to cut).

⁵This content is available online at <<http://cnx.org/content/m30951/1.1/>>.

3.5.5.3 Activity 2:**3.5.5.4 To recognise and represent numbers [LO 1.3.3]**

1. It is sometimes difficult to determine exactly where a decimal number fits into the greater whole. A number line is a handy way of helping you to determine this, because it helps you to “see” the sequence of the numbers. Draw arrows and label with the letters given to indicate more or less where the following numbers will be on the number line:

**Figure 3.26**

- A : 5,82
 B : 5,99
 C : 6,09
 D : 6,24

3.5.5.5 Activity 3:**3.5.5.6 To use a series of techniques to do mental arithmetic [LO 1.10.2]****1. Let us play a game!**

Work with a friend. Take turns. Close your eyes and press on any number in the diagram on the next page with the back of your pencil. Open your eyes and tell your friend what the number consists of:

$$\text{e.g. } 14,38 = 14 + \frac{3}{10} + \frac{8}{100}$$

Colour in every number you get right green. Your friend colours all his / her correct numbers blue. The one who has something wrong misses a turn. The one who has coloured in the most blocks, wins.

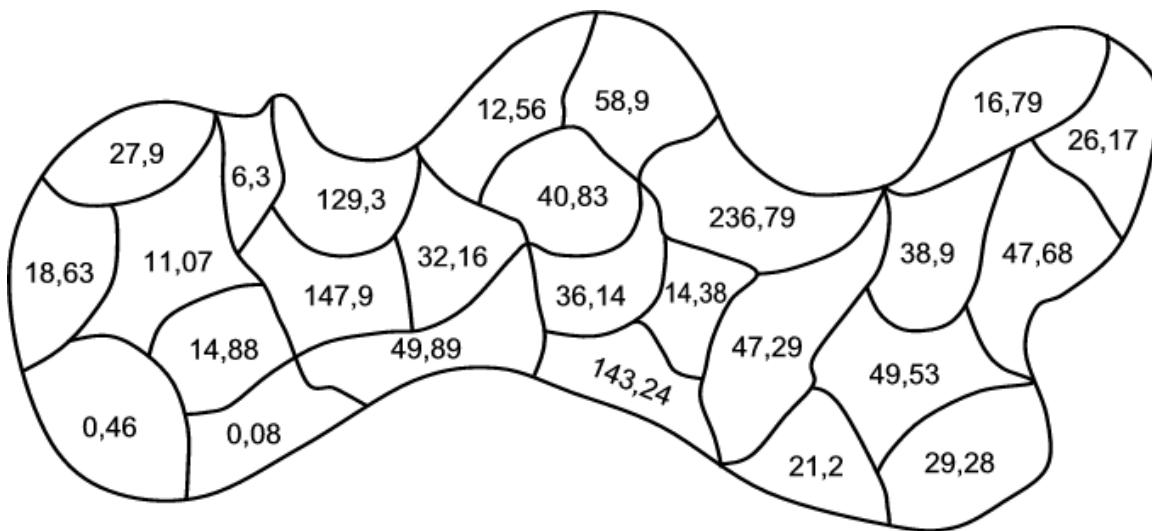


Figure 3.27

3.5.5.7 Activity 4:**3.5.5.8 To recognise and classify numbers in order to compare them [LO 1.3.3]**

1. By now you know how to write tenths and hundredths as decimal fractions. Look very carefully at the following numbers. Replace the * with <, > or =.

Hint: You should break the numbers up as in the game above if you have any doubts about the correct answer.

- 1.1 $1,7 * 1,07$ -----
 1.2 $0,6 * 0,06$ -----
 1.3 $0,58 * 0,9$ -----
 1.4 $0,34 * 0,4$ -----
 1.5 $2,05 * 2,5$ -----
 1.6 $1,8 * 1,80$ -----

Brain-teaser!

What does one quarter ($\frac{1}{4}$) look like as a decimal fraction?

Can you write the following as decimal fractions?

- a) $\frac{3}{4} :$ -----
 b) $\frac{1}{25} :$ -----
 c) $\frac{3}{20} :$ -----
 d) $\frac{17}{50} :$ -----

3.5.5.9 Activity 5:**3.5.5.10 To use tables and checks in order to arrange and record data [LO 5.3]**

1. Challenge!

Take a measuring tape and measure the height of five of your class mates (to 2 digits after the decimal comma). List your results in a table and number your friends from the shortest to the tallest.

| | Name | Height | Numbered:short to tall |
|-----|------|--------|------------------------|
| 1.1 | | | |
| 1.2 | | | |
| 1.3 | | | |
| 1.4 | | | |
| 1.5 | | | |

Table 3.21

3.5.5.11 THOUSANDTHS

Did you know?

When I write one thousandth $\frac{1}{1000}$ as a decimal fraction, it will be 0,001.

The **noughts** are **place holders** for the units, tenths and hundredths and may not be left out.

$\frac{1}{1000} \quad \frac{1}{100}$

| UNITS | Tenths | Hundredths | Thousandths |
|-------|--------|------------|-------------|
| U | t | h | t |
| 1 | 0,1/ | 0,01 / | 0,001 / |

Figure 3.28

3.5.5.12 Activity 6:

3.5.5.13 To recognise, classify and represent numbers in order to describe and compare them
[LO 1.3.3]

1. Look carefully at the representations below. Which decimal numbers are represented in each one?

E.g.

| U | t | h | th |
|---|---|---|----|
| | | | |
| | | | |
| | | | X |
| X | | | X |
| X | | X | X |
| X | X | X | X |

Table 3.22

1.1

| U | t | h | th |
|---|---|---|----|
| | | | X |
| X | | | X |
| X | | | X |
| X | | | X |
| X | | X | X |
| X | | X | X |

Table 3.23

1.2

| U | t | h | th |
|---|---|---|----|
| | | | |
| | x | | |
| | x | | |
| | x | | |
| | x | | x |
| x | x | | x |
| x | x | | x |

Table 3.24

1.3

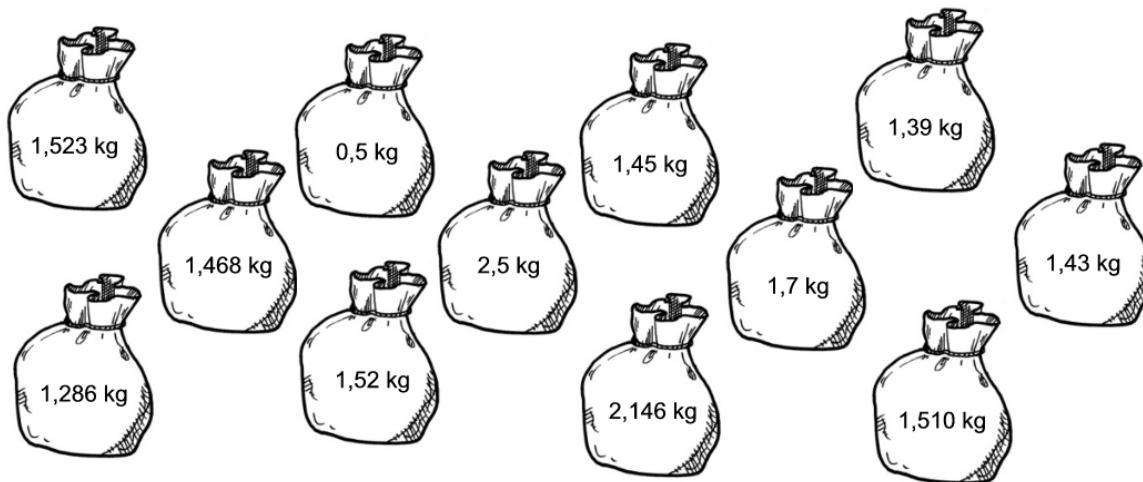
| U | t | h | th |
|---|---|---|----|
| | | x | |
| | | x | |
| | x | x | |
| | | x | x |
| x | x | x | |
| x | x | x | |
| x | x | x | |

Table 3.25

1. Can you write the above as mixed numbers / common fractions?

3.5.5.14 Activity 7:**3.5.5.15 To recognise, classify and represent numbers in order to describe and compare them [LO 1.3.3]**

1. Colour in only the bags that are heavier than 1,5 kg:

**Figure 3.29**

2. In Module 1 we spoke a lot about the value and place value of numbers. (Do you remember?) Look carefully at the following numbers and then write down the value of each number that has been underlined:

E.g. 3,768 : $\frac{8}{1000}$

2.1 4,231 : _____

2.2 8,923 : _____

2.3 289,7 : _____

2.4 $\underline{21},\underline{38}$: _____

2.5 $\underline{57},\underline{236}$: _____

2.6 $\underline{9},\underline{897}$: _____

3. Compare the following numbers. Draw a circle around the smallest one.

Hint: You may change them to ordinary fractions / mixed numbers if you like – this may help you to get the answer more easily!

3.1 0,6 ; 0,06 ; 0,006

3.2 3,2 ; 0,32 ; 0,032

3.3 1,101 ; 1,111 ; 1,110

Brain-teaser!

What does one eighth ($\frac{1}{8}$) look like as a decimal fraction?

And $\frac{3}{8}$? _____ And $\frac{5}{8}$? _____ And $\frac{7}{8}$? _____

Can you write $\frac{112}{250}$ as a decimal fraction? .

What does $\frac{350}{500}$ look like as a decimal fraction?

Explain how you got these answers WITHOUT using the calculator!

3.5.6 Assessment

| |
|--|
| Learning outcomes(LOs) |
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. |
| Assessment standards(ASs) |
| <p>We know this when the learner:</p> <p>1.3 recognises and represents the following numbers in order to describe and compare them:</p> <p>1.3.3 decimal fractions of the form 0,5; 1,5; 2,5, and so on, in the context of measurement;</p> <p>1.5 recognises and uses equivalent forms of the numbers listed above, including:</p> <p>1.5.2 decimal fractions of the form 0,5, 1,5 and 2,5, and so on, in the context of measurement;</p> <p>1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as:</p> <ul style="list-style-type: none"> • measurements in Natural Sciences and Technology contexts; |
| <i>continued on next page</i> |

| |
|--|
| 1.8 estimates and calculates by selecting and using operations appropriate to solving problems that involve: |
| <ul style="list-style-type: none"> • (additional) addition of positive decimals with 2 decimal places; |
| 1.9 performs mental calculations involving: 1.9.1 addition and subtraction; 1.9.2 multiplication of whole numbers to at least 10×10 ; |
| 1.10 uses a range of techniques to perform written and mental calculations with whole numbers including: <ul style="list-style-type: none"> • building up and breaking down numbers; • using a calculator; |
| 1.11 uses a range of strategies to check solutions and judge the reasonableness of solutions; |
| LO 2 |
| Patterns, functions and algebra The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills. |
| We know this when the learner: |
| 2.6 determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule presented |
| 2.6.3 by number sentences. |
| We know this when the learner: |
| 2.6 determines, through discussion and comparison, the equivalence of different descriptions of the same relationship or rule presented |
| 2.6.3 by number sentences. |
| We know this when the learner: |
| 5.3 organises and records data using tallies and tables; |

Table 3.26**3.5.7 Memorandum****3.5.8 ACTIVITY 1**

1. 1.1 $\frac{36}{100} = 0,36$
- 1.2 $1\frac{7}{100} = 1,07$
- 1.3 $3\frac{6}{10} = 3,6 / 3,60$
- 1.4 $42\frac{85}{100} = 42,85$
- 1.5 $47\frac{3}{100} = 47,03$

BRAIN-TEASER!

1. 0,03
2. 0,09
3. 0,4
4. 0,8
5. 0,37
6. 0,59

Only one digit after the comma.

Pocket calculator does not show the last nought.

ACTIVITY 2

1.

A B C D

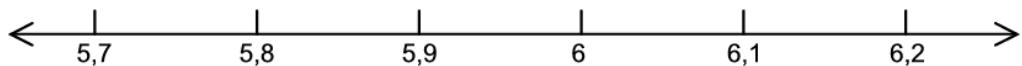


Figure 3.30

ACTIVITY 4

1. 1.1 >

1.2 >

1.3 <

1.4 <

1.5 <

1.6 =

BRAIN-TEASER!

a) 0,75

a) 0,04

b) 0,15

c) 0,34

ACTIVITY 6

1. 1.1: 5,026

• :2,603

• :0,359

2. 2.1: $5 \frac{26}{1000}$

2.2: $2 \frac{603}{1000}$

2.3: $\frac{359}{1000}$

ACTIVITY 7

1. 1,523; 1,52; 2,5; 2,146; 1,7; 1,510; 3,5

2. 2.1 $\frac{3}{100}$

2.2 $\frac{9}{10}$

2.3 $\frac{7}{10}$

2.4 20

2.5 $\frac{6}{1000}$

2.6 $\frac{9}{100}$

3. 3.1 0,006

3.2 0,032

3.3 1,101

BRAIN-TEASER!

0,125; 0,375; 0,625; 0,875

0,448

0,7

Change denominator to 1 000 (equivalent fractions)

3.6 Solve problems in context⁶

3.6.1 MATHEMATICS

3.6.2 Grade 5

3.6.3 ORDINARY FRACTIONS AND DECIMAL FRACTIONS

3.6.4 Module 50

3.6.5 SOLVE PROBLEMS IN CONTEXT

3.6.5.1 ACTIVITY 1:

3.6.5.2 To solve problems in context [LO 1.6.2]

1. Split up into groups of three. Find the solutions to these problems without using your pocket calculator.

- A farmer wants to build a chicken coop with perches and needs the following timber for the job:

- one plank of 4,3 m
- one plank of 2,58 m
- one plank of 3,26 m

What is the total length of all the planks that he needs?

1.2 In a certain residential area trees have to be cut down because they are touching the telephone wires. If they cut 0,259 m from the one tree, 1,5 m from the next and 2,93 m from the third tree, how many metres have been removed from the trees altogether?

1.3 Three buildings have to be painted. If one of the buildings is 16,8 m tall, the second one is 23,495 m tall and the third one is 46,77 m tall, how many metres have to be painted in all?

3.6.5.3 Activity 2:

3.6.5.4 To determine the equivalence and validity of different representations of the same problem through comparison and discussion [LO 2.6.3]

3.6.5.5 ADDITION OF DECIMAL FRACTIONS

1. In Activity 2.15 you had the opportunity of solving problems by using your own methods and techniques. Now you must work with a friend. Read the problem and then work through the different solutions of the various learners.

Three buildings are 58,2 m; 63,54 and 39,249 m high respectively. How high are they altogether?

1.1 I must calculate $58,2 + 63,54 + 39,249$:

It is precisely the same as $58 + \frac{2}{10} + 63 + \frac{5}{10} + \frac{4}{100} + 39 + \frac{2}{10} + \frac{4}{100} + \frac{9}{1000}$

I add the **whole numbers** first: $58 + 63 + 39 = 160$

Then I add all the **tenths**: $\frac{2}{10} + \frac{5}{10} + \frac{2}{10} = \frac{9}{10}$

Then I add the **hundredths**: $\frac{4}{100} + \frac{4}{100} = \frac{8}{100}$

Lastly, I add everything together: $160 + \frac{9}{10} + \frac{8}{100} + \frac{9}{1000}$

$$= 160 + \frac{900}{1000} + \frac{80}{1000} + \frac{9}{1000}$$

$$= 160 \frac{989}{1000}$$

$$= 160,989$$

1.2 I use notation columns to calculate the sum of 58,2; 63,54 and 39,249:

⁶This content is available online at <<http://cnx.org/content/m30968/1.1/>>.

| T | U | t | h | th |
|----|---|---|---|----|
| 5 | 8 | 2 | | |
| 6 | 3 | 5 | 4 | |
| 3 | 9 | 2 | 5 | 5 |
| 16 | 0 | 9 | 8 | 9 |

Table 3.27

The three buildings are 160,989 m high altogether.

1.3 I must calculate $58,2 + 63,54 + 39,249$.

I do it exactly like a normal addition sum but I remember to **keep the commas precisely underneath each other!**

$$\begin{array}{r} 58,200 \\ 63,540 \\ + 39,249 \\ \hline 160,989 \end{array}$$

2. Which method do you choose?

Why?

3. How do the first two methods compare with each other?

3.6.5.6 Activity 3:

3.6.5.7 To calculate by means of selection and through the use of suitable computations (additional) [LO 1.8]

1. Let us see how well you do on your own. Calculate the following without using a pocket calculator:

1.1: $3,247 + 117,9 + 36,58$

1.2: $2,36 + 18,459 + 23,7$

1.3: $5,742 + 87,62 + 49,136$

1.4: $48,5 + 231,8 + 9,826$

2. Try to do the following without any calculations: A farmer wants to fence his camp with wire but he only has loose pieces of wire. He has a piece of 2,5 m, another piece of 0,5 m and a third piece of 1,5m. How much wire does the farmer have altogether?

3. Explain to a friend how you calculated your answer!

4. Check all your answers of 1 and 2 with a calculator.

Brain-teaser!

Can you solve the following magic squares? You may use your calculator!

| | | |
|-----|-----|-----|
| 0,6 | 0,1 | |
| | 0,5 | |
| | | 0,4 |

Table 3.28

| | | |
|---|-----|-----|
| | | 2,6 |
| | 2,3 | |
| 2 | | 2,2 |

Table 3.29

3.6.5.8 Activity 4:

3.6.5.9 To solve problems in context [LO 1.6.2]

1. Split up into groups of three. Your teacher will tell you which one of the problems below must be solved by your group. You will also be given the necessary paper to work on. Remember: no pocket calculators!

- Taxi A needs 36,78 litres of petrol to fill its tank. Taxi B needs 29,9 litres. How many more litres of petrol does taxi A need?
 - Mrs Mmbolo is making curtains for her school's new classrooms. If she needs 172,5 m of material for the ground floor and 98,75 m for the top storey, what is the difference in metres between the material needed for the two floors?
 - After the rainy season two dams on a farm held 459,23 kℓ and 263,587 kℓ of water respectively. What is the difference between the amount of water in the two dams? Give your answer in kℓ.
 - The difference in mass between two animals in the Kruger National Park is 4,963 kg. If the heavier animal has a mass of 75,23 kg, what is the mass of the other one?
2. Now compare your answer with that of a group that had to solve the same problem.
3. Explain your solution to the rest of the class.
 4. Have a class discussion on the differences / similarities in your methods.

3.6.5.10 Activity 5:

3.6.5.11 To use a series of strategies to check solutions and to assess the reasonableness of the solutions [LO 1.11]

1. We have just solved a few problems and discussed the different ways to determine the answers. Work with a friend, read the following problem and take a good look at the given solutions. Make sure that you understand how the answer has been calculated.

3.6.5.12 ADDITION

A restaurant uses 9,786 ℓ milk during breakfast and 5,463 ℓ for supper. How much less milk is used for supper?

1.1 I must calculate $9,786 - 5,463$

I first subtract the **whole numbers**: $9 - 5 = 4$

Then I subtract the **thousandths**: $\frac{6}{1000} - \frac{3}{1000} = \frac{3}{1000}$

Now I subtract the **hundredths**: $\frac{8}{100} - \frac{6}{100} = \frac{2}{100}$

Lastly I subtract the **tenths**: $\frac{6}{10} - \frac{3}{10} = \frac{3}{10}$

Now I add the answers: $4 + \frac{3}{10} + \frac{2}{100} + \frac{3}{1000} = 4.323$

The difference is thus 4,323 ℓ.

1.2 I do it in precisely the same way as normal subtraction but I **write the commas precisely underneath each other**:

$$\begin{array}{r} 9,786 \\ - 5,463 \\ \hline 4,323 \end{array}$$

The restaurant uses 4,323 ℓ less milk at supper time.

2. Whose method do you choose?

Why?

3.6.5.13 Activity 6:**3.6.5.14 To calculate through selection and the use of suitable computations (additional) [LO 1.8.8]**

1. Now use any method and calculate the following without a calculator:

1.1: $6,42 - 2,98$

1.2: $7,23 - 4,57$

1.3: $8,123 - 3,545$

1.4: $9,236 - 3,457$

2. Check your answers with a calculator.

Brain-teaser!

Calculate $5 - 1,426$

3.6.5.15 Activity 7:**3.6.5.16 To solve problems in context [LO 1.6.2]**

Here is a challenge!

This assignment can be placed in your portfolio. Make sure that you read the criteria for assessment very carefully before you start. Ask your teacher for the necessary paper.

1. Look for examples of decimal fractions in your local newspaper or your favourite magazine. Cut them out neatly and paste them in below.
2. Write the decimal fractions as ordinary fractions next to or below the ones you have pasted in.
3. Now calculate the difference between the greatest and the smallest decimal fraction.
4. Calculate the sum of the two greatest decimal fractions.
5. Make a list of objects for which you would not use decimal fractions. Make a neat sketch of these objects.

3.6.6 Assessment

| |
|--|
| LO 1 |
| Numbers, Operations and RelationshipsThe learner is able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems. |
| Assessment standards(ASs) |
| |
| We know this when the learner: |
| 1.3 recognises and represents the following numbers in order to describe and compare them: |
| 1.3.3 decimal fractions of the form $0,5; 1,5; 2,5$, and so on, in the context of measurement; |
| 1.5 recognises and uses equivalent forms of the numbers listed above, including: |
| <i>continued on next page</i> |

| |
|--|
| 1.5.2 decimal fractions of the form 0,5, 1,5 and 2,5, and so on, in the context of measurement; |
| 1.6 solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as: |
| <ul style="list-style-type: none"> • measurements in Natural Sciences and Technology contexts; |
| 1.8 estimates and calculates by selecting and using operations appropriate to solving problems that involve: |
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| 1.9 performs mental calculations involving: 1.9.1 addition and subtraction; 1.9.2 multiplication of whole numbers to at least 10×10 ; |
| 1.10 uses a range of techniques to perform written and mental calculations with whole numbers including: |
| <ul style="list-style-type: none"> • building up and breaking down numbers; • using a calculator; |
| 1.11 uses a range of strategies to check solutions and judge the reasonableness of solutions; |

Table 3.30

3.6.7 Memorandum

ACTIVITY 2

3. Actually the same

ACTIVITY 3

1. 1.1: 157,727

1.2: 44,519

1.3: 142,498

1.4: 290,126

2. 4,5 m

BRAIN-TEASER!

0,8; 2,4; 1,9;

0,7; 0,3; 2,5; 2,1;

0,2; 0,9; 2,7;

ACTIVITY 6

1. 1.1: 3,44

1.2: 2,66

1.3: 4,578

1.4: 5,779

Chapter 4

Term 4

4.1 Length¹

4.1.1 MATHEMATICS

4.1.2 Grade 5

4.1.3 MEASUREMENT AND TIME

4.1.4 Module 51

4.1.5 LENGTH

In this learning unit we shall be looking at different units used to measure length, as well as at the importance of measuring accurately.

4.1.5.1 Activity 1:

- To measure and record [LO 4.5.3]
- To measure accurately with the appropriate measuring instruments [LO 4.7.3]

1. Let us start right away! How well do you know yourself? Measure the following as accurately as possible (your friend may help you):

- 1.1 the length of your thumb nail
- 1.2 the length of your little finger
- 1.3 the length of your right foot
- 1.4 the length of your left arm from your shoulder to the tip of your middle finger
- 1.5 How tall are you?
- 1.6 How high can you reach when you jump up from the ground?
- 1.7 How much higher is this than your height?

2. What did you use to measure the above?
3. What other measuring apparatus could we also use to measure length?

Do you still remember?

$$1 \text{ cm} = 10 \text{ mm}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ m} = 1\ 000 \text{ mm}$$

$$1 \text{ km} = 1\ 000 \text{ m}$$

Did you know?

¹This content is available online at <<http://cnx.org/content/m30966/1.1/>>.

- One metre is roughly the distance from an adult's nose to the tip of his middle finger on his stretched out hand.
- The length of a fingernail is roughly 1 cm.
- The length of a hand is roughly 10 cm.
- The space underneath your fingernail is roughly 1 mm.
- The breadth of a little finger is roughly 10 mm.

4. Work together with a friend and complete the following table.

| | Measure | Estimate | Actual Measurement | Difference |
|----|---|----------|--------------------|------------|
| a) | the height of your educator | ..... | ..... | ..... |
| b) | the breadth of your classroom | ..... | ..... | ..... |
| c) | the height of your desk/table | ..... | ..... | ..... |
| d) | the total length of the blackboard in the classroom | ..... | ..... | ..... |

Table 4.1

4.1.5.2 Activity 2:

4.1.5.3 To solve problems that include selecting, calculating with and converting standard units [LO 4.6]

1. It is important for us to know which measuring units are used for specific lengths. In order to do that correctly, we must know exactly how long the different measuring units are. Let us see how good you are at this! Choose a suitable unit to measure the following:

- 1.1 The chest size of Dad's suit (of clothes) is 102 ____
- 1.2 The height of my bedroom wall is 4 ____
- 1.3 The breadth of the stoep of the farmhouse is 2,5 ____
- 1.4 The thickness of my dictionary is 40 ____
- 1.5 The distance between Johannesburg and Cape Town is more than 1 000 ____
- 1.6 The depth of the water in our swimming pool is 1,500 ____

2. Circle the measurement that is the closest to reality:

2.1 Our classroom door is about ____ high.

- (a) 20 m
- (b) 200 mm
- (c) 2 km
- (d) 2 m

2.2 My foot is about ____ long.

- (a) 26 cm
- (b) 26 mm
- (c) 26 km
- (d) 26 m

2.3 The distance from Durban to East London is ____

- (a) 674 mm
- (b) 674 km
- (c) 674 m
- (d) 674 cm

3. Let us look at the way of writing length in the decimal form:

We already know that $10 \text{ mm} = 1 \text{ cm}$

Thus: $25 \text{ mm} = 10 + 10 + 5 \text{ mm} = 1\text{cm} + 1 \text{ cm} + 5 \text{ mm} = 2 \text{ cm} + 5 \text{ mm} = 2,5 \text{ cm}$ or $2 \frac{1}{2} \text{ cm}$
Complete the table:

| | | | | | | | |
|--------------|----|-------|-------|-------|-------|-------|-------|
| Number of mm | 10 | 85 | ..... | 245 | ..... | 1 026 | ..... |
| Number of cm | 1 | ..... | 4,2 | ..... | 17,9 | ..... | 146,3 |

Table 4.2

4. We know that there are 1 000 mm in 1 m

Thus: $2 347 \text{ mm} = 2 \text{ m } 347 \text{ mm} = 2,347 \text{ m}$

Complete the table:

| | mm | m |
|------|-------|-------|
| e.g. | 4 328 | 4,328 |
|  | ..... | 3 |
| | 367 | ..... |
|  | ..... | 4,7 |
| | 28 | ..... |
|  | ..... | 0,067 |
| | 6 | ..... |

Table 4.3

5. In the same way $1 000 \text{ m} = 1 \text{ km}$

Thus: $1 407 \text{ m} = 1 \text{ km } 407 \text{ m} = 1,407 \text{ km}$

Complete the table:

| | | | | | | | |
|----------------|-------|-------|-------|-------|-------|-------|-------|
| Distance in m | 2 368 | ..... | 426 | ..... | 38 | ..... | 9 |
| Distance in km | 2,368 | 7 | ..... | 0,6 | ..... | 1,48 | ..... |

Table 4.4

4.1.5.4 Activity 3:

- To measure two-dimensional figures [LO 4.5.3]

4.1.5.5 To use standard units to record [LO 4.5.3]

4.1.5.6 SCALE:

DID YOU KNOW?

When we draw something, e.g. a house, we don't draw it as big as it actually is.

We draw it to scale. The shape stays the same but the size is different (smaller). The knife below is drawn on a scale of 1:4



Figure 4.1

Now think about maps. Normally a place will be drawn much smaller than it actually is in reality. A **scale** tells us how to measure distances on a map. In the map below 1 cm equals 500 km.

1. Answer the following questions:

- 1.1 What is the actual length of the knife above? 1_____
1.2



Figure 4.2

- a) What is the actual distance, according to the scale, from town A to town B?.....

- a) And from C to D?.....

2. Determine the scale of each item below:
- 2.1 The actual length of the crayon is 15 cm.
Scale:
- 2.2 The actual length of the bottle is 80 cm.
Scale:
- 2.3 The actual length of the fish is 45 cm.
Scale:
- Now measure the distance. _____ mm
 - How many cm is it?
 - How many m is it?

Now take any 340 ml cool drink tin and measure the distance around it in mm.

4.1.6 Assessment

| |
|---|
| LO 4 |
| MeasurementThe learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts. |
| We know this when the learner: |
| 4.1 reads, tells and writes analogue, digital and 24-hour time to at least the nearest minute and second; |
| 4.2 solves problems involving calculation and conversion between appropriate time units including decades, centuries and millennia; |
| 4.3 uses time-measuring instruments to appropriate levels of precision including watches and stopwatches; |
| 4.4 describes and illustrates ways of representing time in different cultures throughout history; |
| 4.5 estimates, measures, records, compares and orders two-dimensional shapes and three-dimensional objects using S.I. units with appropriate precision for: |
| <ul style="list-style-type: none"> • mass using grams (g) en kilograms (kg); • capacity using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); • length using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); |
| 4.6 solves problems involving selecting, calculating with and converting between appropriate S.I. units listed above, integrating appropriate contexts for Technology and Natural Sciences; |
| 4.7 uses appropriate measuring instruments (with understanding of their limitations) to appropriate levels of precision including: |
| <ul style="list-style-type: none"> • bathroom scales, kitchen scales and balances to measure mass; • measuring jugs to measure capacity; • rulers, metre sticks, tape measures and trundle wheels to measure length. |

Table 4.5

4.1.7

4.1.8 Memorandum

ACTIVITY 1

3. tape measure / metre stick / trundle / ruler / string / wool

Activity 2

1. 1.1: cm

1.2: m

1.3: m

1.4: mm

1.5: km

1.6: m

2. 2.1: 2 m

2.2: 26 cm

2.3: 674 km

3.

| | | | | | | | |
|--|-----|--|------|--|-------|--|------|
| | | | 42 | | 179 | | 1463 |
| | 8,5 | | 24,5 | | 102,6 | | |

Table 4.6

4.

| mm | m |
|-------|-------|
| 3 000 | |
| | 0,367 |
| 4 700 | |
| | 0,028 |
| 67 | |
| | 0,006 |

Table 4.7

5.

| | | | | | | |
|--|-------|-------|-----|-------|-------|-------|
| | 7 000 | | 600 | | 1 480 | |
| | | 0,426 | | 0,038 | | 0,009 |

Table 4.8

ACTIVITY 3

1. 20 cm

1.1: 1 250 km

1.2: 1 500 km

2. 2.1: 1:5

2.2: 1:20

2.3: 1:15

4.2 Mass²

4.2.1 MATHEMATICS

4.2.2 Grade 5

4.2.3 MEASUREMENT AND TIME

4.2.4 Module 52

4.2.5 MASS

4.2.5.1 Activity 1:

4.2.5.2 To solve problems that include the selection of standard units [LO 4.6]

1. As in length, it is essential that we know when to use grams, kilograms and tons as units.

Work with a friend, taking turns. Take any three objects in your class. Hold each one separately and arrange them from the lightest to the heaviest. In which unit would you weigh these items: grams? kg?; ton?

Complete the table:

| | Item | From light to heavy | Unit |
|----|-------|---------------------|-------|
| 1. | | | |
| 2. | | | |
| 3. | | | |

Table 4.9

DO YOU STILL REMEMBER?

$$1\ 000\ \text{g} = 1\ \text{kg}$$

$$1\ 000\ \text{kg} = 1\ \text{ton}$$

Sometimes an object can be so light that you can't weigh it on a normal scale. Tick the objects that you think weigh less than 1 gram.

| | | |
|----------------|-----------|-----------------|
| a feather | a rubber | a pin |
| a staple | an orange | a grain of sand |
| a hair elastic | a pen | a hair |

Table 4.10

4.2.5.3 Activity 2:

4.2.5.4 To measure and record [LO 4.5.1]

4.2.5.5 To measure accurately using appropriate measuring instruments [LO 4.7.1]

DID YOU KNOW?

When we want to determine the **mass** of an object, it means that we want to know how **heavy** it is or how much it **weighs**. To be able to do this, we need a **scale**.

Please write down all the different kinds of scales you can think of:

²This content is available online at <<http://cnx.org/content/m30973/1.1/>>.

1. Study the following scales carefully. Work with a friend and write down the reading of each scale.

1.1



Figure 4.3

1.2



Figure 4.4

1.3



Figure 4.5

1.4



Figure 4.6

1.5

**Figure 4.7**

1.6

**Figure 4.8**

2. Kyk na die volgende tekeninge en skryf die massa van die voorwerpe neer.

2. Look at the following drawings and write down the mass of each object:

2.1

**Figure 4.9**

2.2

**Figure 4.10**

2.3

**Figure 4.11**

2.4



Figure 4.12

4.2.5.6 Activity 3:**4.2.5.7 To estimate, measure and record [LO 4.5.1]****4.2.5.8 To measure accurately using appropriate measuring instruments [LO 4.7.1]**

Work in groups of three. Bring the following items from home:

A scale; 1 cup of raw rice; 1 cup of sugar; 1 cup of flour; 1 cup of salt; 1 cup of all bran/corn flakes and 1 cup of raisins. (Remember to use **the same cup** each time you measure).

1. Determine the mass of each item and complete the table.

| Item | Mass in g estimated | Item weighed | Difference |
|-------|---------------------|--------------|------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Table 4.11

2. Which item is the heaviest?
3. Which item is the lightest?

4.2.5.9 Activity 4:**4.2.5.10 To solve problems that include selecting, calculating with and converting standard units [LO 4.6]**

LET US REVISE!

How will we write the grams in the table above as kg?

I know $1\ 000\ \text{g} = 1\ \text{kg}$

Thus: $1\ \text{g} = \frac{1}{1000}\ \text{kg} = 0,001\ \text{kg}$

In the same way 17 g will be 17 thousandths of a kg.

$17\ \text{g} = 0,017\ \text{kg}$

and $234\ \text{g} = 0,234\ \text{kg}$

$4\ 387\ \text{g} = 4\ \text{kg}\ 387\ \text{g} = 4,387\ \text{kg}$

1. Write the following as kg.

a) 9 g

b) 26 g

- c) 89 g
 d) 436 g
 e) 2 309 g
 f) 5 006 g

**Figure 4.13**

2. Study the different weight pieces below. Choose the **fewest number** of weights you will need to balance the scale and write them down.

| | Mass | Weights needed |
|------|----------|----------------|
| e.g. | 1,010 kg | 1 kg ; 10 g |
| | 1,023 kg | ..... |
| | 1,023 kg | ..... |
| | 1,007 kg | ..... |
| | 1,056 kg | ..... |
| | 983 g | ..... |
| | 724 g | ..... |

Table 4.12

4. Rounding off

4.1 Can you round off the following to the nearest kg?

- (a) 7,6 kg
 (b) 0,5 kg
 (c) 4,2 kg
 (d) 2,5 kg

4.2 Round off the following to the nearest ton:

- (a) 20,8 t
 (b) 29,4 t
 (c) 1,5 t
 (d) 34,9 t

BRAIN-TEASER!

You want to determine the mass of a chair. You have a bathroom scale, but the chair is too big for it and falls off. How can you determine the mass of the chair **without** using a bigger scale?

4.2.6 Assessment

| |
|---|
| LO 4 |
| Measurement The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts. |
| We know this when the learner: |
| 4.1 reads, tells and writes analogue, digital and 24-hour time to at least the nearest minute and second; |
| 4.2 solves problems involving calculation and conversion between appropriate time units including decades, centuries and millennia; |
| 4.3 uses time-measuring instruments to appropriate levels of precision including watches and stopwatches; |
| 4.4 describes and illustrates ways of representing time in different cultures throughout history; |
| 4.5 estimates, measures, records, compares and orders two-dimensional shapes and three-dimensional objects using S.I. units with appropriate precision for: |
| <ul style="list-style-type: none"> • mass using grams (g) en kilograms (kg); • capacity using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); • length using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); |
| 4.6 solves problems involving selecting, calculating with and converting between appropriate S.I. units listed above, integrating appropriate contexts for Technology and Natural Sciences; |
| 4.7 uses appropriate measuring instruments (with understanding of their limitations) to appropriate levels of precision including: |
| <ul style="list-style-type: none"> • bathroom scales, kitchen scales and balances to measure mass; • measuring jugs to measure capacity; • rulers, metre sticks, tape measures and trundle wheels to measure length. |

Table 4.13**4.2.7 Memorandum****ACTIVITY 1**

| | | | | |
|--|---|--|--|---|
| | ✓ | | | ✓ |
| | ✓ | | | ✓ |
| | | | | ✓ |

Table 4.14**ACTIVITY 2**

Bathroom scale; spring balance; kitchen scale; balance/scale

1.

1.1: 6,25 kg

1.2: 88,5 kg

1.3: 3 kg

1.4: 17,68 kg

1.5: 210 g

1.6: 172 kg

2.
 2.1: 3,050 kg
 2.2: 5,710 kg
 2.3: 1,215 kg
 2.4: 0,604 kg
ACTIVITY 4
 1. 1.1: 0,009
 1.2: 0,026
 1.3: 0,089
 1.4 0,436
 1.5 2,309
 1.6 5,006
 3.

| MASS | PIECES NEEDED |
|------|----------------------------------|
| | 1 kg; 20 g; 2 g; 1 g |
| | 1 kg; 20 g; 5 g; 2 g; 1 g |
| | 1 kg; 5 g; 2 g |
| | 1 kg; 50 g; 5 g; 1 g |
| | 20 g; 10 g; 2 g; 1 g |
| | 500 g; 200 g; 200 g; 200 g; 50 g |
| | 500 g; 200 g; 20 g; 2 g; 2 g |

Table 4.15

4.
 4.1
 a) 8
 b) 1
 c) 4
 d) 3
 4.2
 a) 21
 b) 29
 c) 2
 d) 35

BRAIN-TEASER!

Stand on scale and take the reading; then hold chair above your head while on the scale and take reading again (or vive versa); the difference in the readings is the mass of the chair.

4.3 Capacity³

4.3.1 MATHEMATICS

4.3.2 Grade 5

4.3.3 MEASUREMENT AND TIME

4.3.4 Module 53

4.3.5 CAPACITY

Capacity

Activity 1:

- To solve problems that include the selection of standard units [LO 4.5.2, 4.6]
- To measure accurately with the use of appropriate measuring instruments [LO 4.7.2]

DID YOU KNOW?

A liquid doesn't have a particular shape, but takes on the shape of the container. We measure liquid in litres and millilitres. Large quantities are measured in kilolitres.

Do you still remember?

$$1\ 000\ \text{m}\ell = 1\ \text{litres}$$

$$1\ 000\ \text{litres} = 1\ \text{k}\ell$$

1. You have now seen in the sections on length and mass that we use different measuring units for different situations. In the same way we also use specific units to determine various types of capacity. In which measuring unit would you measure the content of the following?

1.1 eye drop

1.2 petrol for Dad's car

1.3 a glass of fruit juice

1.4 the dam that supplies water for your city?

2. TO MAKE SURE OF AT HOME

2.1 A teaspoon can take _____ mℓ of liquid.

2.2 A medicine spoon can take _____ mℓ of liquid.

2.3 A tablespoon can take _____ mℓ of liquid.

2.4 A teacup can take _____ mℓ of liquid.

2.5 A coffee mug can take _____ mℓ of liquid.

2.6 Dad's car can take _____ litres of petrol in its tank.

2.7 Your swimming pool (if you have one) takes _____ kℓ water.

2.8 Your kettle holds _____ litres of water

2.9 A small bottle of medicine takes _____ mℓ

2.10 You bath in about _____ litres of water

3. Use the above answers to answer the following:

3.1 Every day Mom drinks five cups of tea. How many mℓ of tea is that?

How many litres of tea does she drink daily?

3.2 Dad drinks three mugs of coffee at work. How many mℓ of coffee is that?

Write this as litres.

- If you have to drink two teaspoonsfuls at a time, how many times will

³This content is available online at <<http://cnx.org/content/m30976/1.1/>>.

you be able to take medicine before the bottle is empty?

DID YOU KNOW?

The biggest waterfalls in the world are the Bogoma falls in the Congo River. Every second 17 000 kℓ flow over the edge of this waterfall! Can you say how many litres of water this is per second?

Activity 2:

To solve problems that include selecting, calculating and converting standard units [LO 4.6]

1. Complete the following tables:

| | | | | | | | | |
|-----|--------|--------|-------|-------|-------|-------|-------|-------|
| 1.1 | ml | 3 268 | 4 | ..... | 16 | ..... | 369 | ..... |
| | litres | 3, 268 | ..... | 0,98 | ..... | 1,423 | ..... | 0,006 |

Table 4.16

| | | | | | | | |
|-----|--------|-------|-------|-------|-------|-------|-------|
| 1.2 | litres | 7 000 | 18 | ..... | 1 479 | ..... | 3,012 |
| | k ℓ | 7 | ..... | 0,002 | ..... | 0,261 | ..... |

Table 4.17

2. Increase the following capacities by 75 ml:

$$2.1: 4,325 \text{ litres}$$

$$2.2: 2,500 \text{ litres}$$

$$2.3: 6,050 \text{ litres}$$

$$2.4: 5,035 \text{ litres}$$

4. Decrease the following capacities by 50 ℓ.

$$4.1: 16,750 \text{ kℓ}$$

$$4.2: 13,085 \text{ kℓ}$$

$$4.3: 18,900 \text{ kℓ}$$

$$4.4: 17,658 \text{ kℓ}$$

ADDITION AND SUBTRACTION:

When I add or subtract with units of length, mass and capacity it is easiest to convert everything to the **smallest unit**, e.g.

$$y = 5,094 \text{ m} + 342 \text{ mm} + 0,087 \text{ m} + 9 \text{ mm}$$

$$= 5 094 \text{ mm} + 342 \text{ mm} + 87 \text{ mm} + 9 \text{ mm}$$

$$\begin{array}{r} 5\ 094 \\ 342 \\ 87 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5\ 532 \\ \hline \end{array}$$

$$= 5 532 \text{ mm}$$

$$y = 5,532 \text{ m}$$

I also convert everything to the smallest unit before I subtract, e.g.

$$k = 9,075 \text{ ton} - 4 328 \text{ kg}$$

$$= 9 075 \text{ kg} - 4 328 \text{ kg}$$

$$\begin{array}{r} 9\ 075 \\ - 4\ 328 \\ \hline \end{array}$$

$$\begin{array}{r} 4\ 747 \\ \hline \end{array}$$

$$= 4 747 \text{ kg}$$

$$k = 4,747 \text{ t}$$

5. Calculate the following:

$$5.1 c = 4,7 \text{ km} + 876 \text{ m} + 2,794 \text{ km} + 65 \text{ m}$$

$$5.2 \text{ e} = 7,632 \text{ kg} - 1,278 \text{ g}$$

$$5.3 \text{ f} = 2,03 \text{ k}\ell + 432 \text{ litres} + 0,869 \text{ k}\ell + 38 \text{ litres}$$

$$5.4 \text{ h} = 19 \text{ litres} - 2,347 \text{ ml}$$

Activity 3:

To solve problems that include selecting, calculating and converting standard units [LO 4.6]

Choose a friend to work with you, and try to solve the following problems. You are NOT allowed to use a pocket calculator! Ask your teacher for paper to work on.

1. The following items must be filled with petrol:

- the school bus 85,6 litres
- a motor-bike 14,65 litres
- an empty can 893 ml
- a pick-up van 64,4 litres

- How many litres of petrol will be used altogether?
- Write your answer as kℓ.

2. A family's mass is made up as follows:

- newly-born infant 2 667 g
- sister 19,8 kg
- mother 63,9 kg

- 2.1 What is the joint mass of the family in kg?

- 2.2 Write your answer in tons.

3. The Grade 5's do textile painting on pieces of material that consist of the following lengths:

- 585 mm
- 1,024 m
- 362 mm

- 3.1 On how many mm of material have they painted altogether?

- 3.2 Give your answer in metres.

4. If an elephant has an average weight of 7 tons and a hippopotamus has an average weight of 1 500 kg, what is the difference in mass between them? Give your answer in kg first, and then in tons.

5. A barrel contains approximately 9,5 litres of water. If I fill a 775 ml bottle from it, how much water is left in the barrel? Write your answer as litres.

6. There are 16,84 metres of material on a roll. If your mother cuts off 739 cm, how many metres of material are left on the roll?

Write your answer as mm.!

7. Use a pocket calculator to check your answers.

8. Now compare your answers with the rest of the class and have a class discussion on the best way of solving the above-mentioned problems.

9. Give your answers to your teacher for assessment.

4.3.6 Assessment

| |
|---|
| LO 4 |
| Measurement The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts. |
| We know this when the learner: |
| 4.1 reads, tells and writes analogue, digital and 24-hour time to at least the nearest minute and second; |
| 4.2 solves problems involving calculation and conversion between appropriate time units including decades, centuries and millennia; |
| 4.3 uses time-measuring instruments to appropriate levels of precision including watches and stopwatches; |
| 4.4 describes and illustrates ways of representing time in different cultures throughout history; |
| 4.5 estimates, measures, records, compares and orders two-dimensional shapes and three-dimensional objects using S.I. units with appropriate precision for: |
| <ul style="list-style-type: none"> • mass using grams (g) en kilograms (kg); • capacity using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); • length using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); |
| 4.6 solves problems involving selecting, calculating with and converting between appropriate S.I. units listed above, integrating appropriate contexts for Technology and Natural Sciences; |
| 4.7 uses appropriate measuring instruments (with understanding of their limitations) to appropriate levels of precision including: |
| <ul style="list-style-type: none"> • bathroom scales, kitchen scales and balances to measure mass; • measuring jugs to measure capacity; • rulers, metre sticks, tape measures and trundle wheels to measure length. |

Table 4.18**4.3.7****4.3.8 Memorandum**

ACTIVITY 1

1. 1.1 mℓ

1.2 ℓ

1.3 mL

1.4 kℓ

2. 2.1: 5

2.2: 5

2.3: 15

2.4: 200

2.5: 250

2.6 – 2.10 own answers

3. 3.1: 1 000

1 ℥

3.2: 750

0,750

DID YOU KNOW?

17 000 000
ACTIVITY 2
2.1

| | | | | | | | |
|-------|--|-------|-----|-------|-------|-------|---|
| mℓ | | | 980 | | 1 423 | | 6 |
| liter | | 0,004 | | 0,016 | | 0,369 | |

Table 4.19

2.2

| | | | | | | |
|-------|--|-------|---|-------|-----|-------|
| liter | | | 2 | | 261 | |
| kℓ | | 0,018 | | 1,479 | | 3,012 |

Table 4.20

3.
 3.1: 4,342 ℓ
 3.2: 2,575 ℓ
 3.3: 6,125 ℓ
 3.4: 5,110 ℓ
 4.
 4.1: 16,7 kℓ
 4.2: 13,035 kℓ
 • :18,850 kℓ
 • :4.4 17,608 kℓ

5.
 5.1: 8,435 km
 8 435 m
 5.2: 6 354 g
 6,354 kg
 5.3: 3 369 ℓ
 3,369 kℓ
 5.4: 16 653 mℓ
 16,653 ℓ

4.4 Time⁴

4.4.1 MATHEMATICS

4.4.2 Grade 5

4.4.3 MEASUREMENT AND TIME

4.4.4 Module 54

4.4.5 TIME

Activity 1:

⁴This content is available online at <<http://cnx.org/content/m30977/1.1/>>.

To solve problems that include calculating and converting appropriate time units [LO 4.2]

1. COMPETITION TIME!

In this activity your general knowledge will be tested. Let us see who can answer first – the boys or the girls! Each correct answer is worth 2 points. Points will be subtracted if learners shout out.

- 1.1 How many months are there in a year?
- 1.2 Which months have only 30 days?
- 1.3 Which months have 31 days?
- 1.4 How many days are there in a year?
- 1.5 How many days are there in a leap year?
- 1.6 How many days does February have in a leap year?
- 1.7 How many days are there in a school week?
- 1.8 How many seconds are there in a minute?
- 1.9 How many minutes are there in an hour?
- 1.10 How many hours are there in a day?
- 1.11 How many weeks are there in a year?
- 1.12 How many minutes are there in quarter of an hour?
- 1.13 How many seconds are there in three-quarters of a minute?
- 1.14 How many days does December have in a leap year?

Who won?

BRAIN-TEASERS!

- How many years are there in a decade?
- What is a millennium?
- What is another word for a time period of 100 years?
- Some people use v.a.e. and a.e. instead of BC (Before Christ) and AD (Anno Domini). What do they mean?

DID YOU KNOW?

We use the Christian calendar that began with the birth of Jesus. The names of the months originated from Roman times. E.g. August is named after the Roman emperor, Augustus Caesar, who lived from 27 BC to 14 AD.

Activity 2:

To describe and illustrate the way in which time is represented in different cultures [LO 4.4]

1. CHALLENGE: SOME “RESEARCH” FOR YOUR PORTFOLIO!

Let us do some research into how time is indicated in other cultures. Ask your teacher for the paper you will need to work on.

- See whether you can find a Jewish or Muslim calendar.
- Compare it to our calendar and make a list of the differences and similarities.
- Tell your classmates how they differ, and in what way they are similar.
- Give it to your teacher for assessment.
- Exhibit it in the classroom for all to see.
- Remember to file it neatly in your portfolio.

REMEMBER THESE ABBREVIATIONS

seconds : s

minutes : min

hour : h

day : d

week : wk

month : mo

year : a

DID YOU KNOW?

The symbol for hour (h), comes from the Latin word “hora” that means “hour”.

The symbol for year was originally “a”. This comes from the Latin word “annus”, which means “year”.

Activity 3:

To use measuring instruments, including stop-watches, to measure time accurately [LO 4.3]

1. What is a stop-watch?
2. Work together with a friend and complete the table, using a stop-watch.

| | | Time estimated | Time measured | Difference |
|----|--------------------------------------|----------------|---------------|------------|
| 1. | Count up to 20 | ..... | ..... | ..... |
| 2. | Tie your shoe lace | ..... | ..... | ..... |
| 3. | Open and close the classroom window. | ..... | ..... | ..... |
| 4. | Write your name and surname. | ..... | ..... | ..... |
| 5. | Calculate 468×7 | ..... | ..... | ..... |

Table 4.21**Activity 4:**

To solve problems that include calculation and conversion of appropriate units of time [LO 4.2]

1. Work together with a friend and calculate:

1.1 how many seconds there are in:

3 min:

$2\frac{1}{2}$ min:

$\frac{3}{4}$ min:

$\frac{9}{10}$ min:

1 hour:

1.2 how many minutes there are in:

2 hours:

$1\frac{1}{2}$ hour:

$\frac{1}{4}$ hour:

$3\frac{1}{6}$ hour:

a day:

1.3 How many hours there are in:

your school day:

1 week:

$1\frac{1}{4}$ day:

360 min:

1.4 How many days there are in:

8 weeks:

264 hours:

$\frac{1}{2}$ year :

2 leap years

BRAIN-TEASER!

How many years are there in 2 centuries, 9 decades, 72 months and 156 weeks?

LET US LOOK AT WATCHES AND READ TIME!

Did you know?

Galileo, a famous scientist from Italy, studied pendulums. The first clocks were made by using pendulums.

CHALLENGE

Make your own pendulum. Tie a piece of rope to a stone. Tie the end of the rope to a branch of a tree and let the stone swing to and fro.

Take a stop-watch and see how long it takes for the stone to swing to and fro 10 times.

Shorten the rope and time the 10 swings again. What do you notice?

Replace the stone with a lighter stone. Take the time for 10 swings again. What do you notice now?

Activity 5:

To read, say and write analogue, digital and 24 hour time to at least the nearest minute and second [LO 4.1]

It is of the utmost importance that we understand how to read time on the different watches, because time is a major factor in our lives. It determines whether we are on time for appointments or not!

1. LET US HAVE A CLASS DISCUSSION

1.1 What is the difference between an “analogue” watch and a “digital” watch?

1.2 What is the function of the long hand and the short hand of the “analogue” watch?

1.3 When do we use “past” and “to” with the analogue watch?

1.4 What do the first two digits indicate on a digital watch?

1.5 What do the last two digits indicate on a digital watch?

1.6 What do the abbreviations “a.m.” and “p.m.” mean?

Do you still remember?

The international notation for time makes use of the 24 hour clock. We write it in the same way that time is indicated on a digital clock. Remember that there must always be **2** digits before and **2** digits after the colon!

2. Write the following in international time:

2.1 20 minutes before 6 in the morning

2.2 half past 6 in the evening

2.3 quarter to 4 in the afternoon

2.4 midnight

2.5 18 minutes before 3 in the morning

2.6 24 minutes before 9 in the evening

2.7 quarter past 5 in the afternoon

COURSE (LENGTH) OF TIME

REMEMBER!

There is a difference between “time” and “course of time”!

Time: e.g. **What is the time?** Eight o'clock.

Course of time: **how long it takes**, e.g. a journey from Cape Town to Worcester takes an hour and a half.

Activity 6:

To solve problems that include selecting, calculating with and converting standard units

[LO 4.6]

1. Split up into groups of three. Ask your teacher for paper to work on and try to find the answers to the following:

- Mvesi leaves by taxi on a visit to his family in Middelburg, Cape. If he departs from Cape Town and arrives in Middelburg at 17:05, how long did the journey take?
- A participant in the Two Oceans marathon sets off at 06:15. It takes him 8 hours and 20 minutes to complete the race. At what time did he stop running?
- Dudu is 11 years and 3 months of age. His father, Mr Sooliman, is 39 years and 11 months old. What is their combined age?
- Mr Katlego worked overseas for 9 months and 2 weeks, while Mrs Solomons toured overseas for 4 months and 3 weeks. What is the difference in time that the two were not in South Africa?

2. Compare your answers to those of a different group.
3. Now illustrate on the board one of your calculations to the rest of the class.
4. Have a class discussion on the way in which the above-mentioned problems can be solved successfully.

Activity 7:

To determine the equivalence and validity of different representations of the same problem through comparison and discussion [LO 2.6.3]

1. In the previous activity you had the opportunity of solving problems in a way that made the most sense to you. Now work through the following with a friend and look at the different methods that were used.

The Grade 5's are planning an outing to a crocodile farm. The buses will arrive at approximately 08:45 and will leave at 13:10. How long will they spend at the farm?

1.1 From 08:45 to 09:00 : 15 min

From 09:00 to 13:00 : 4 hours

From 13:00 to 13:10 : 10 min

Thus: Course of time: $4 \text{ h} + 15 \text{ min} + 10 \text{ min} = 4 \text{ h } 25 \text{ min}$

1.2 From 08:45 to 13:45 it is 5 hours

This is actually 35 minutes too much.

$5 \text{ h} - 35 \text{ min} = 4 \text{ h } 25 \text{ min}$

1.3 I calculate it in this way: $13 \text{ h } 10 \text{ min} = 12 \text{ h } 70 \text{ min}$

$- 08 \text{ h } 45 \text{ min} \quad \underline{- 08 \text{ h } 45 \text{ min}}$

4 h 35 min

2. Whose method do you choose?

Why?

Activity 8:

To solve problems that include selecting, calculating with and converting standard units [LO 4.6]

1. See whether you can solve the following on your own:

Study the tides in Table Bay.

| |
|----------------------------------|
| Tides in Table bay |
| High tide |
| Today: 06:52 and 19:24 |
| Tomorrow: 07:38 and 20:15 |
| Low tide |
| Today: 00:54 and 12:40 |
| Tomorrow: 01:41 and 13:40 |

Table 4.22

- 1.1 How many hours and minutes will pass between "today's" two high tide times?
- 1.2 How many hours and minutes pass between "tomorrow's" two low tide times?
2. The taxi's leave from Cape Town Station every 25 minutes. If the first taxi leaves at 06:15, write down the departure times of the 9 taxis that follow after the first one.

3. Write down the following in international time:

3.1 10 minutes earlier than 08:35

3.2 27 minutes earlier than 17:15

3.3 38 minutes earlier than 22:00

3.4 45 minutes earlier than 04:55

Activity 9:

To determine the equivalence and validity of different representations of the same problem through comparison and discussion [LO 2.6.1]

1. In this activity you will again have the opportunity of trying to find different solutions to the same problem with your friends. Divide into groups of three. Discuss the following problem and solutions (methods) and then explain them to a friend who doesn't understand as well as you do.

Loretta's practice times for gymnastics are as follows Monday : 2 hours 40 min Wednesday : 1 hour 55 min Thursday : 3 hours 18 min How much time does she spend practising altogether?

$$1.1 \quad 2 \text{ hours } 40 \text{ min} + 1 \text{ hour } 55 \text{ min} + 3 \text{ hours } 18 \text{ min}$$

$$2 \text{ h} + 1 \text{ h} + 3 \text{ h} = 6 \text{ h}$$

$$40 \text{ min} + 55 \text{ min} + 18 \text{ min} = 113 \text{ min}$$

$$= 1 \text{ h } 53 \text{ min}$$

$$\text{Thus: } 6 \text{ h} + 1 \text{ h} + 53 \text{ min} = 7 \text{ h } 53 \text{ min}$$

1.2 I prefer to write the time below each other:

$$2 \text{ h } 40 \text{ min}$$

$$1 \text{ h } 55 \text{ min}$$

$$\underline{3 \text{ h } 18 \text{ min}}$$

$$\underline{\underline{6 \text{ h } 113 \text{ min}}}$$

$$= 6 \text{ h} + 1 \text{ h} + 53 \text{ min} (113 \text{ min} = 1 \text{ h } 53 \text{ min})$$

$$= 7 \text{ h } 53 \text{ min}$$

2. Whose method do you like best?

Why?

Activity 10:

To solve problems that include selecting, calculating with and converting standard units [LO 4.6]

1. In the previous activities you were exposed to a variety of methods. Now use any method and calculate:

$$1.1 \quad 3 \text{ weeks } 5 \text{ days} + 7 \text{ weeks } 6 \text{ days} + 9 \text{ weeks } 2 \text{ days}$$

$$1.2 \quad 8 \text{ days } 17 \text{ hours} + 5 \text{ days } 21 \text{ hours} + 4 \text{ days } 19 \text{ hours}$$

$$1.3 \quad 6 \text{ hours } 45 \text{ min} + 3 \text{ hours } 38 \text{ min} + 2 \text{ hours } 54 \text{ min}$$

$$1.4 \quad 5 \text{ min } 29 \text{ seconds} + 9 \text{ min } 43 \text{ seconds} + 4 \text{ min } 42 \text{ seconds}$$

$$1.5 \quad 7 \text{ years } 9 \text{ months} + 6 \text{ years } 8 \text{ months} + 5 \text{ years } 11 \text{ months}$$

Activity 11:

To determine the equivalence and validity of different representations of the same problem through comparison and discussion [LO 2.6.1]

1. Look at the following problem and then discuss the solutions together as a class. Make sure that you understand each method very well.

Sven has been following the programme "Survivors" on TV and noticed that team A took 4 days 18 hours to cover a certain distance. Team B took 7 days 5 hours to complete the same distance. How much longer did team B take?

1.1 I must calculate 7 days 5 hours - 4 days 18 hours.

$$4 \text{ days } 18 \text{ hours to } 5 \text{ days} = 6 \text{ hours}$$

$$5 \text{ days to } 7 \text{ days } 5 \text{ hours} = 2 \text{ days } 5 \text{ hours}$$

$$2 \text{ days } 5 \text{ hours} + 6 \text{ hours} = 2 \text{ days } 11 \text{ hours}$$

$$1.2 \quad 7 \text{ days } 5 \text{ hours} - 4 \text{ days } 18 \text{ hours}$$

$$7 \text{ days } 5 \text{ hours} = 6 \text{ days } 29 \text{ hours} (1 \text{ day} = 24 \text{ hours})$$

$$6 \text{ days} - 4 \text{ days} = 2 \text{ days}$$

$$29 \text{ hours} - 18 \text{ hours} = 11 \text{ hours}$$

The answer is thus 2 days 11 hours

1.3 I answer it in this way:

$$6 \text{ } 5 + 24 = 29 \text{ (1 day} = 24 \text{ hours)} \quad 7 \text{ days } 5 \text{ hours}$$

$$\underline{- 4 \text{ days } 18 \text{ hours}}$$

2 days 11 hours (29 – 18)

Which method do you understand the best?

Activity 12:

To solve problems that include selecting, calculating with and converting standard units [LO 4.6]

1. Use all the knowledge that you have gained up to now, choose a method you prefer, and calculate the following:

1.1 19 weeks 3 days - 12 weeks 5 days

1.2 17 days 13 hours - 11 days 19 hours

1.3 9 hours 34 minutes - 3 hours 47 minutes

1.4 15 years 7 months - 9 years 10 months

CHALLENGE!

See if you can get the following information from a library (or perhaps the internet!)

1. How did all the months of the year get their names? (You already know about August).

2. Why does February only have 28 days?

3. Why do some months have 31 days and other months have 30 days?

Make a colourful poster showing the above information and share it with the class.

4.4.6 Assessment

| |
|---|
| LO 4 |
| Measurement The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts. |
| We know this when the learner: |
| 4.1 reads, tells and writes analogue, digital and 24-hour time to at least the nearest minute and second; |
| 4.2 solves problems involving calculation and conversion between appropriate time units including decades, centuries and millennia; |
| 4.3 uses time-measuring instruments to appropriate levels of precision including watches and stopwatches; |
| 4.4 describes and illustrates ways of representing time in different cultures throughout history; |
| 4.5 estimates, measures, records, compares and orders two-dimensional shapes and three-dimensional objects using S.I. units with appropriate precision for: <ul style="list-style-type: none"> • mass using grams (g) en kilograms (kg); • capacity using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); • length using millimetres (mm), centimetres (cm), metres (m) en kilometres (km); |
| <i>continued on next page</i> |

| |
|--|
| <p>4.6 solves problems involving selecting, calculating with and converting between appropriate S.I. units listed above, integrating appropriate contexts for Technology and Natural Sciences;</p> <p>4.7 uses appropriate measuring instruments (with understanding of their limitations) to appropriate levels of precision including:</p> <ul style="list-style-type: none"> • bathroom scales, kitchen scales and balances to measure mass; • measuring jugs to measure capacity; • rulers, metre sticks, tape measures and trundle wheels to measure length. |
|--|

Table 4.23**4.4.7 Memorandum****ACTIVITY 1**

- 1.
- 1.1: 12
- 1.2: April; June; September; November
- 1.3: January; March; May; July; August; October; December
- 1.4: 365
- 1.5: 366
- 1.6: 29
- 1.7: 5
- 1.8: 60
- 1.9: 60
- 1.10: 24
- 1.11: 52
- 1.12: 15
- 1.13: 45
- 1.14: 31

BRAIN-TEASER!

- 10
- 1 000 years
- century

ACTIVITY 3

1. measures time to one hundredth of a second

ACTIVITY 4

- 1.
- 1.1:
- 180
- 150
- 45
- 54
- 3 600
- 1.2
- 120
- 90
- 15
- 190

- 1 440
 1.3
 may differ
 168
 30
 6
 1.4
 56
 11
 $182 \frac{1}{2}$
 732
 BRAIN-TEASER!
 299
 ACTIVITY 5
 2.1 seven o'clock / 07:00 / 19:00
 2.2 20 min. past 3 (p.m.)
 2.3 five min. to 7 / 06:55 / 18:55
 2.4 10 min. to 9 (a.m.)
 2.5 $\frac{1}{4}$ to 5 (a.m)
 2.6 half past 7; 19:30; 07:30
 3. 3.1: 06:20
 3.2: 18:30
 3.3: 15:45
 3.4: 00:00 / 24:00
 3.5: 02:42
 3.6: 20:36
 3.7: 17:15
 ACTIVITY 8
 1. 1.1: 19 h 24 min.
 $\underline{- 06 \text{ h } 52 \text{ min.}}$
 12 h 32 min.
 1.2: 13 h 40 min.
 $\underline{- 01 \text{ h } 41 \text{ min.}}$
 11 h 59 min.
 2.
 06:40; 07:05; 07:30
 07:55; 08:20; 08:45
 09:10; 09:35; 10:00
 3.
 3.1: 08:25
 3.2: 16:48
 3.3: 21:22
 3.4: 04:15
 ACTIVITY 10
 1.
 1.1: 19 w 13 d
 $= 20 \text{ w } 6 \text{ d}$
 1.2: 19 days 9 hours
 1.3: 13 hours 17 min.
 1.4: 19 min. 54 sec.
 1.5: 20 years 4 months

ACTIVITY 12

1.

- 1.1: 6 weeks 5 days
- 1.2: 5 days 18 h
- 1.3: 5 hours 47 min.
- 1.4: 5 years 9 months

4.5 Geometry⁵**4.5.1 MATHEMATICS****4.5.2 Grade 5****4.5.3 GEOMETRY, DATA HANDLING AND PROBABILITY****4.5.4 Module 55****4.5.5 GEOMETRY**

Geometry

4.5.5.1 Activity 1:

- To describe, sort and compare 2-D shapes [LO 3.2.2]
- To examine and compare 2-D shapes LO 3.3.3]

1. Let us revise the work that you did in Grade 4. At the same time you can see how good your memory is! For the following activity you will have to use your father's hammer and nails. Just keep your thumb out of the way!

4.5.5.1.1 You require:

- Wooden planks - 30 cm × 30 cm
- Nails
- Elastic bands

Place the nails about 1,5 cm apart.

DO YOU STILL REMEMBER?

A **quadrilateral** is any figure with 4 sides and 4 angles.

A **square** has four sides of equal length and four 90° angles.

The opposite sides of a **rectangle** are of equal length and all four angles are 90°.

A **triangle** is any figure with 3 angles and 3 sides.

1.1 Form the following figures with rubber bands on the nail board.

1.2 Draw two of each figure on the dotted sheet (p. 5).

Quadrilateral

Square

Rectangle

Triangle

1.3 Have a class discussion: Make a list of all the similarities between your figures on the peg-board.

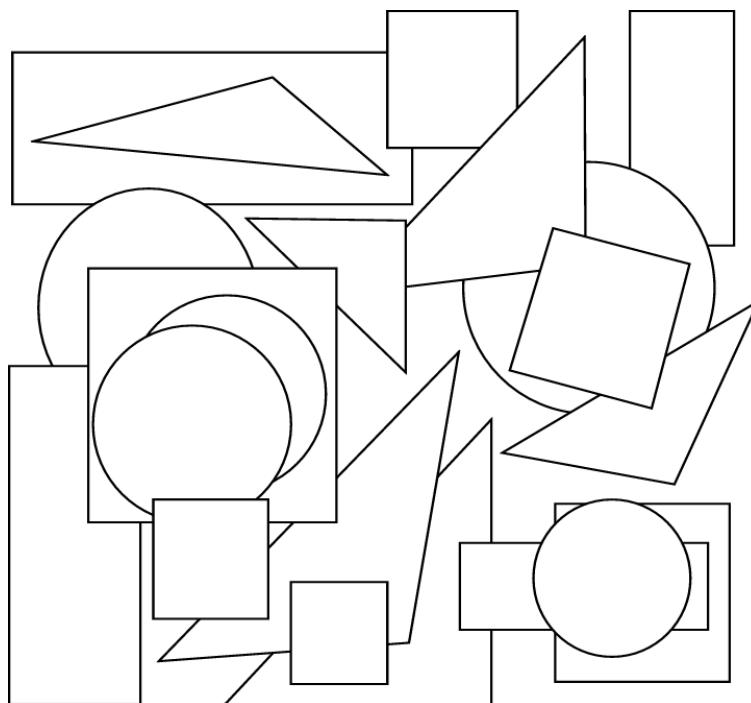
1.4 Now draw and examine the figures on your dotted page (page 4) and, as a class, see how much dissimilarity you can find among them.

⁵This content is available online at <<http://cnx.org/content/m30978/1.1/>>.

4.5.5.2 Activity 2:

- To describe, sort and compare 2-D shapes from drawings and pictures [LO 3.2.2]
- To recognise and describe natural and cultural 2-D shapes [LO 3.6]

1. Page through old newspapers and magazines and cut out examples of quadrangles, squares, rectangles and triangles. Paste them into the appropriate boxes below. Get a friend to check whether you have done it correctly. (Hint: See whether the qualities of the figure match those of the example that your friend pasted in.)

4.5.5.3 Activity 3:**4.5.5.4 To visualise and name 2-D shapes [LO 3.1.2]****Figure 4.14**

Now let us see how good you are at observing shapes. Below you will see squares, triangles and circles that have been laid out to overlap here and there. Examine them carefully and then complete the instructions that follow.

1. Colour the parts of all the triangles you can see in purple. How many triangles are there?
2. Colour all the circles in pink. How many circles are there?
3. Colour all the squares in red. How many squares are there?
4. Colour all the rectangles in green. How many rectangles are there?

4.5.5.5 Activity 4:

4.5.5.6 To compare 2-D shapes with reference to certain qualities [LO 3.2.2]

Although it sounds very simple, it is still extremely important for you to know how many sides and angles a figure has, because it can help us to classify polygons without much trouble. Use the drawings below and then complete the table that follows.

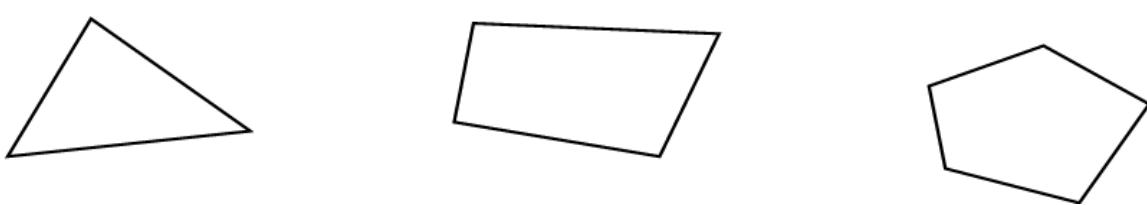


Figure 4.15

A triangle, quadrilateral and a pentagon

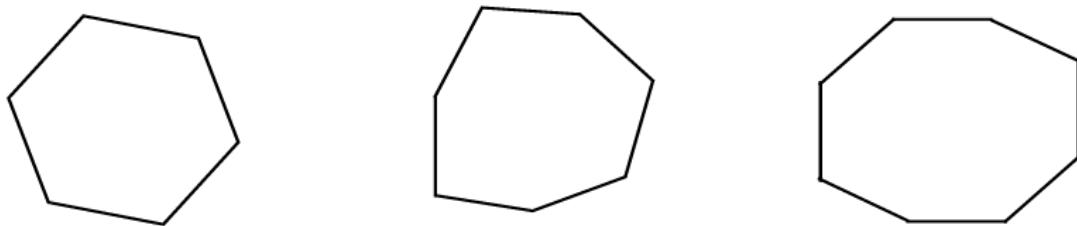


Figure 4.16

A hexagon, heptagon and an octagon

| | | | | | | | | | |
|---|---|---|---|-------|-------|---|----|-----|-----|
| Number of sides in the polygon | 3 | 4 | 5 | | | 8 | 12 | 100 | 220 |
|---|---|---|---|-------|-------|---|----|-----|-----|

| | | | | | | | | | |
|------------------------------------|---|-------|-------|---|---|-------|-------|-------|-------|
| Number of triangles in the polygon | 1 | | | 4 | 5 | | | | |
|------------------------------------|---|-------|-------|---|---|-------|-------|-------|-------|

Table 4.24**4.5.5.7 Activity 5:****4.5.5.8 To draw and describe 2-D shapes in terms of symmetry [LO 3.3.1]**

This activity is an assignment for your portfolio. Read the instructions as well as the assessment criteria carefully before you start. Ask your teacher to explain where necessary.

First of all, test your memory. Explain the meaning of “symmetrical” to your friend.

1. Use magazines to find pictures of shapes / figures that are symmetrical.
 - Paste them on to the sheet of paper given to you by your teacher.
 - Indicate the axis of symmetry with a coloured chalk. (Use your ruler!)
2. Do the following:
 - Neatly copy the shapes that you used for the table in Activity 1.7 onto a sheet of paper. (Ask your teacher for some paper.) You can draw them as large as you like.
 - Indicate the axes of symmetry neatly.

4.5.5.9 Activity 6:**4.5.5.10 To examine and compare 3D objects [LO 3.3.1]****4.5.5.11 To recognise 3D objects [LO 3.1.1]**

So far we have worked with 2-dimensional shapes. Let’s now take a good look at 3-dimensional figures.

1. Have a class discussion. What is the difference between 2-dimensional and 3-dimensional figures?
2. How would you like to be an architect and a builder? Now you and your friend have the opportunity to build the school of your dreams! You need the following:

- a large sheet of cardboard
- glue and a pair of scissors
- matchboxes, etc. (Use your own, clever ideas!)

This school must have classrooms and there must be a round swimming pool. Naturally you will also want a computer centre and a school hall. The changing rooms and the rugby field must be close together.

First study the following useful information before you start:

The following information might be useful:

A structure like a matchbox is called a **RECTANGULAR PRISM**, because the faces are all rectangles.

A **CUBE** is a special type of rectangular prism, because the **FACES** of a cube are all squares.

3. After your model has been completed, you must complete the table below. Look at the figures you have made. If, for instance, the hall is a rectangular prism, it must be written in the applicable column.

| Rectangular prisms | Cubes | Other 3D shapes | 2D shapes |
|--------------------|-------|-----------------|-----------|
| e.g. Hall | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Table 4.25

4.5.5.11.1**4.5.5.12 Activity 7:****4.5.5.13 To make patterns from geometric shapes and to describe them in terms of tessellations [LO 3.5.1]****4.5.5.13.1 TESSELLATIONS**

Think about how tiles are laid on a wall or the floor of a bathroom. The tiles fit exactly against one another. The spaces you can see are only there for the cement or glue so that the tiles can stick properly and will not fall off.

The tiles usually look like this when they are laid:

We say the tiles **TESSELLATE** because they fit into one another EXACTLY without spaces between them.

1. This afternoon when you are at home, look at the tiles in your bathroom, kitchen or any other room. You could also look at the floor or wall tiles in any shop in your area. Make a drawing of what they look like in the box below:

2. Now look at the drawing of the tiles above. Can you see that the inside tiles are **rectangles** and the outside tiles are **triangles**?

Now make your own patterns by combining

- triangles
- quadrilaterals
- pentagons
- any creative shape

4.5.6 Assessment

| |
|---|
| LU 3 |
| Space and Shape (Geometry)The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions. |
| We know this when the learner: |
| 3.1 recognises, visualises and names two-dimensional shapes and three-dimensional objects in natural and cultural forms and geometric settings including those previously dealt with and focusing on: 3.1.1 similarities and differences between cubes and rectangular prisms; |
| <ul style="list-style-type: none"> • similarities and differences between squares and rectangles; |
| 3.2 describes, sorts and compares two-dimensional shapes and three-dimensional objects from the environment and from drawings or pictures according to properties including: |
| <ul style="list-style-type: none"> • number and/or shape of faces • number and/or length of sides; |
| 3.3 investigates and compares (alone and/or as a member of a group or team) two-dimensional shapes and three-dimensional objects studied in this grade according to properties listed above by: |
| <ul style="list-style-type: none"> • making models of geometric objects using polygons they have cut out; • drawing shapes on grid paper; |
| 3.5 makes two-dimensional shapes, three-dimensional objects and patterns from geometric shapes and describes these in terms of: |
| <ul style="list-style-type: none"> • tessellations; |
| 3.6 recognises and describes natural and cultural two-dimensional shapes, three-dimensional objects and patterns in terms of geometric properties. |

Table 4.26

4.5.7**4.5.8 Memorandum****ACTIVITY 3**

1. 6
2. 5
3. 6
4. 4

ACTIVITY 4

- 6 ; 7
 3 ; 6 ; 10 ; 98 ; 218

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By: Siyavula Uploaders

URL: <http://cnx.org/content/m22881/1.1/>

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Module: "To be able to do mental arithmetic"

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Module: "To count and calculate correctly without using a pencil and paper"

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Module: "To recognise numbers and represent them correctly"

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Module: "To improve your mental arithmetic skills"

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Module: "To represent, recognise and compare numbers"

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Module: "To describe and illustrate different cultures' ways of writing"

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Module: "To recognise, describe and use laws"

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Module: "To estimate and calculate by selecting and using suitable operations"

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Module: "To solve in context problems that concern economic issues"

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Module: "To be able to do mental arithmetic"

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Module: "Recognise and classify ordinary fractions"

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Module: "Selection and computations"

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Module: "Recognise, classify, represent and describe numbers"

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Module: "Tables and checks to arrange and record data"

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